DOCUMENT RESUME

ED 261 238 CE 042 465

TITLE Pipehanger Blueprint Reading, B-28.
INSTITUTION Connecticut State Dept. of Education, Hartford. Div. of Vocational-Technical Schools.
PUB DATE 84
NOTE 105p.; Some pages of this document may not reproduce well because of small, broken type.
PUB TYPE Guides - Classroom Use - Guides (For Teachers) (052)

EDRS PRICE MF01/PC05 Plus Postage.
DESCRIPTORS *Apprenticeships; Behavioral Objectives; *Blueprints; Classroom Techniques; Definitions; Equipment Utilization; Guidelines; Learning Activities; *Plumbing; Postsecondary Education; *Specifications; State Curriculum Guides; Teaching Methods; *Trade and Industrial Education
IDENTIFIERS *Submarines

ABSTRACT

This outline, for the course numbered B-28, is designed for use in teaching apprentice pipehangers who are working with submarines how to interpret piping and hanger blueprints accurately and to visualize complete hanger assemblies, piping symbols, and the locations of the items discussed on the blueprints. Addressed in the individual lessons of the course are the following topics: understanding and using the 688 Standard Cross-Referencing System, reading configuration drawings, locating various hanger assemblies on blueprints, understanding and using piping symbols and references, and using the TRIDENT Class Cross-Referencing System. Each lesson contains some or all of the following: lesson objectives, a list of materials required, questions and answers, definitions, technical drawings, and instructional text. (MN)

**********
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
**********

ED261238

# B-28

# PIPEHANGER BLUEPRINT READING

DIVISION OF VOCATIONAL-TECHNICAL SCHOOLS

CONNECTICUT DEPARTMENT OF EDUCATION

1983-1984

CE042465

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

L R Warner

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

COURSE TITLE: PIPEHANGER BLUEPRINT READING

COURSE NUMBER: B-28

PERFORMANCE OBJECTIVES: The student will be able to accurately interpret piping and hanger blueprints and readily visualize complete hanger assemblies, piping symbols, and the locations of items discussed.

PREREQUISITES: PH-1

TEXTBOOKS: B-28 PIPEHANGER BLUEPRINT READING

DRAWINGS:

688 CLASS

256372 R/F, 216357 R/M, 255454 R/L, 256373 R/F
2355-202 R/H, 6353-591 R/Z, 2285-213 R/F,
2744-51 R/J, 2744-33 R/H, 2740-377 R/K, 2285-237 R/C
2285-238 R/C, 2300-543 R/N, 2300-544 R/P,
2300-547X1,

TRIDENT CLASS

2620-286-10 R/N, 2620-286-11 R/K, 2620-286-12 R/M,
2620-286-13 R/H, 2620-286-14 R/G, 87524-9071 R/K
87524-4006 R/D, 87742-1702 R/G, 87742-1701 R/G
87522-2122 R/D, 87522-2123 R/D, 87522-2124 R/D
87744-3002 R/G, 87744-3004 R/G, 87742-1302 R/E
87742-3104 R/F, 87742-3103 R/P, 87742-3101 R/E

B-28 Pipehanger Blueprint Reading

Lesson 1

Materials Req.

Handout - 688 Class Cross Referencing System

Dwgs. 2355-202 R/H, 256372 R/F, 216357 R/M, 255454 R/L, 256373 R/F

Student Material List Answer Sheet

Part 1 of 3

Instructions:

Discuss Cross Referencing Using H/O only

Part 2 of 3

Instructions:

Issue plans listed on lead sheet of H/O. Follow the format shown on H/O using standard plans.

Part 3 of 3

Instructions:

Completely identify hanger H-5 using cross-referencing system without use of H/O. Student Material Answer Sheet will be used for answers.

# 688 STANDARD CROSS REFERENCING SYSTEM

## PURPOSE:

THE PRIMARY OBJECTIVE OF THIS HANDOUT IS TO FAMILIARIZE YOU WITH BLUEPRINT (CROSS-REFERENCE) SYSTEM OF STANDARD DRAWINGS ESTABLISHED FOR THE VERIFICATION OF MATERIALS NEEDED TO FABRICATE AND INSTALL A HANGER ASSEMLY. THIS SAME SYSTEM IS ALSO UTILIZED TO VERIFY THE MATERIALS OF A PRE-FABRICATED ASSEMBLY.

OBTAIN THE NECESSARY PLANS FROM THE PLAN FILE. BE CERTAIN THEY ARE THE LATEST REVISIONS.

FOR MATERIAL VERIFICATION YOU WILL NEED THE HANGER PRINT AND A COMPLETE SET OF 688 HANGER STANDARD DRAWINGS (SEE THE LIST OF PLAN NUMBERS ON THE HANDOUT COVERSHEET).

688 HANGER DETAIL

2355-202

688 HANGER STANDARD DRAWINGS:

| | |
|---|---|
| 216357 | 255454 |
| 256373 | 256372 |

TO BE TURNED IN AFTER CLASS !!!!

NOTE: Index is a good time saver.

## TABLE OF CONTENTS


| | TITLE |
|---|---|
| 1 | TITLE SHEET |
| 2 | REVISIONS |
| 3 | TABLE OF CONTENTS & REFERENCES |
| 4 & 5 | NOTES |
| 6 & 7 | LIST OF MATERIAL |
| 8 | ASSEMBLY-HANGER H1 |
| 9 | ASSEMBLY-HANGER H2 |
| 10 | ASSEMBLY-HANGER H3 |
| 11 | ASSEMBLY-HANGER H4 |
| 12 | ASSEMBLY-HANGER H5 |
| 13 | ASSEMBLY-HANGER H7 |
| 14 | ASSEMBLY-HANGER H8 |
| 15 | ASSEMBLY-HANGER H9 |
| 16 | ASSEMBLY-HANGER H10 |
| 17 | ASSEMBLY-HANGER H11 |
| 18 | ASSEMBLY-HANGER H12 |
| 19 | ASSEMBLY-HANGER H13 |
| 20 | ASSEMBLY-HANGER H14 |
| 21 | ASSEMBLY-HANGER H15 |
| 22 | ASSEMBLY-HANGER H16 |
| 23 | ASSEMBLY-HANGER H17 |
| 24 | ASSEMBLY-HANGER H18 |
| 25 | ASSEMBLY-HANGER H19 |
| 26 | ASSEMBLY-HANGER H20 |
| 27 | ASSEMBLY-HANGER H21 |
| 28 | ASSEMBLY-HANGER H22 |
| 29 | DETAIL RUBBER BLOCK H1 |
| 30 | DETAIL RUBBER BLOCK H2 |
| 31 | DETAIL RUBBER BLOCK H10 |
| 32 | DETAIL RUBBER BLOCK H11 |
| 33 | DETAIL ITEM 26 |
| 34 | ASSEMBLY HANGER H23 |
| 35 | ASSEMBLY-HANGER H24 & H25 |
| 36 | ASSEMBLY-HANGER H26 |
| 37 | ASSEMBLY-HANGER H27 |
| 38 | ASSEMBLY-HANGER H28 |
| 39 | ASSEMBLY-HANGER H30 |
| 40 | ASSEMBLY-HANGER H31 |
| 41 | ASSEMBLY HANGER H32 & H33 |
| 42 | DETAIL RUBBER BLOCK H23, H24 & H25/1134 |
| 43 | DETAIL RUBBER BLOCK H26 |
| 44 | ASSEMBLY-HANGER H34 |
| 45 | ASSEMBLY HANGERS H6-A & H6-B |
| 46 | ASSEMBLY-HANGER H35 & 1136 |


7

## NOTES

1. Starting with hanger detail plan 2355-202
2. Go to index and locate the hanger in question and sheet No.

NOTE: Always look in the index hangers are not always listed in order.

NOTE: Ref. Block shows you all related drawings to this plan.

START WITH H-5

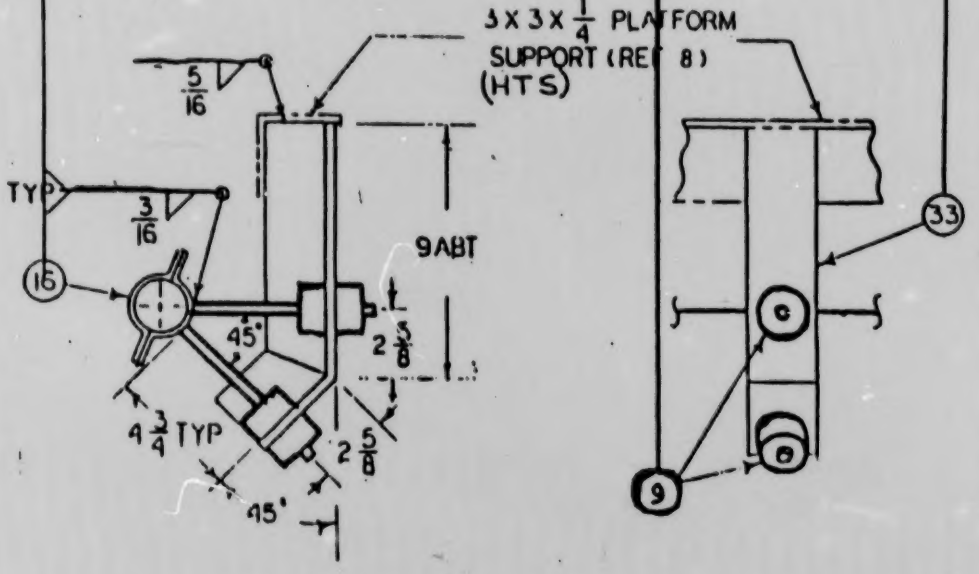
## REFERENCES

| NO. | TITLE | NAVSHIPS NO | DWG NO |
|---|---|---|---|
| 1 | PP ARR ELEC & AUX FW COOL TB & FROM AIR CPRSR ER PLAN | 516-4458871 | 2355-101 |
| 2 | HOT NOTES FOR BELOS & WAT'L SUB STRUCTURE (NON-NUC) | 845-4454179 | 8100-346 |
| 3 | PAINTING SCHEDULE | 805-4483198 | 8300-1 |
| 4 | PIPE HANGER DETAIL & DESIGN INSTRUCTIONS | | 255454 |
| 5 | SPI STRUCTURES-SPOOL MID RESILIENT PIPE HANGERS | | 256372 |
| 6 | PLATFORM OR STRUCTURE 76-87 UL ER | 103-4458614 | 1000-481 |
| 7 | RESILIENT MOUNTS FOR PIPE HANGERS-ASSY & DET | | 216357 |
| 8 | ARR PLATING UL FR 76-87 | 803-4455839 | 1000-59 |
| 9 | FDN-LP AIR SYSTEM ER | 113-4458117 | 1220-1498 |
| 10 | BED PLATE HP AIR COMPRESSOR | 516-4553588 | 6351-14 |
| 11 | TANK BILGE COLLECTING SYS ER FR 78-83 & | 115-4459033 | 1210-581 |
| 12 | SOUND DAMPING INT PRESS HULL AFT FRAME 65 | 601-45555414 | 7020-36 |
| 13 | HP AIR COMPRESSOR | | 6351-81 #1 |
| 14 | FDN - H.P. AIR DRAIN SEPARATOR E.R. | 113-4557052 | 1220-2215 |
| 15 | BEDPLATE H.P. AIR FILTER, COOLER & MOIS. SEPR. | 516-4553589 | 7240-658 |

8

HANGERS H5

| HANGER H5 CONSISTING OF: | | | |
|---|---|---|---|
| ITEM NO | QTY | L/M SHNO | REMARKS |
| 9 | 2 | 6 | |
| 16 | 1 | 6 | |
| 33 | 1 | 7 | SEE NOTE 6 |




ELEV LKG PORT

SECT LKG AFT

FWD

NOTES

1. Remember your theory.
2. Item 9 consists of (Mount) (Rod) (Nuts)
3. For further information go to Ref. Block in the upper right hand corner of this page.

   Item 9
   QTY 2
   L/M Sh 6
4. Go to Sh 6 find Item 9

PRIME COAT: ZINC CHROMATE
SEE NOTE 16

| HULL NO. ——— | DWG. NO. 355-202 | REV F |
|---|---|---|
| NAVSHIPS 516-4554955 | SHEET 12 OF ___ | |

## NOTES

1. L/M gives you description and Ref. Drawings.
2. The description of item 9 is 50# unbonded MTS
3. For further information go to Ref. Block for plan numbers to locate all the parts to MTS.
4. Ref. Dwg. 216357 SH 19 Assy 97A.
5. Procede to proper drawing and Assy.

NOTE: Always read into the Remarks Column.

LIST OF MATERIAL — QUANTITIES ARE FOR ONE

| SEE DET | ASSY NO ITEM NO | MIC LVL | ZONE | DESCRIPTION | MATL | MATL SPEC | REF DWG | NH STK OR STOCK NO | REMARKS | NOISE CONT (SEE NOTE) | REV |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | NA | | TYPE 5 RUBBER BLOCK 3/4 THK | SYN RUBBER | MIL-S-6855 CL II | 255454 SH 29, PC 7 | | SEE DETAIL SH 32 | | A |
| | 2 | NA | | 100# UNBONDED SPOOL MOUNT ASSY | VARIOUS | ——— | 216357 SH 18 ASSY "96A" | | | | A |
| | 3 | NA | | TYPE 4 HANGER SUPPORT (HOD) | STEEL | MIL-S-20166 TY U, GR N | 256372 SH 10 ASSY 4A100 (HOD) | | SEE HGR DET SH 16 & 17 | | A |
| | 4 | NA | | 50# UNBONDED SPOOL MOUNT ASSY | VARIOUS | ——— | 216357 SH 19 ASSY "97B" | | | | A |
| | 5 | NA | | TYPE 1 HANGER SUPPORT | STEEL | QQ-S-741 | 256372 SH 110 ASSY "1A50" | | | | A |
| | 6 | NA | | TYPE 1 STRAP HANGER | VARIOUS | ——— | 255454 SH 14 ASSY "AE" | | | | A |
| | 7 | NA | | TYPE 7 HANGER SUPPORT | STEEL | VARIOUS | 256372 SH 131 ASSY "7H50" | | SEE HGR DET SH 14 & 78 | | A |
| | 8 | NA | | TYPE 3 HANGER SUPPORT | STEEL | MIL-S-20166 TY U, GR N | 256372 SH 8 ASSY "3B50" | | | | A |
| | 9 | NA | | 50# UNBONDED SPOOL MOUNT ASSY | VARIOUS | ——— | 216357 SH 18 ASSY "97A" | | | | A |
| | 10 | NA | | TYPE 1 STRAP HANGER | VARIOUS | ——— | 255454 SH 14 ASSY "F" | | | | A |
| | 11 | NA | | TYPE 7 HANGER SUPPORT | STEEL | ——— | 256372 SH 121 ASSY "7G50" | | SEE HGR DET SH 18, 18 & 19 | | A |
| | 12 | NA | | TYPE 3 HANGER SUPPORT | STEEL | QQ-S-741 | 256372 SH 8 ASSY "3A50" | | | | A |
| | 13 | NA | | TYPE 12 HANGER ASSY | VARIOUS | ——— | 255454 SH 34 ASSY "KF" | | | | A |
| | 14 | NA | | 50# UNBONDED SPOOL MOUNT ASSY | VARIOUS | ——— | 255454 SH 55 ASSY "FB" | | | | A |
| | 15 | NA | | TYPE 4 HANGER SUPPORT | STEEL | QQ-S-741 | 256372 SH 10 ASSY "4A50" | | SEE HGR DET SH 75 | | A |
| | 16 | NA | | TYPE 1 STRAP HANGER | VARIOUS | ——— | 255454 SH 14 ASSY "E" | | | | A |
| | 17 | NA | | TYPE 4 HANGER SUPPORT (HOD) | STEEL | QQ-S-741 | 256372 SH 10 ASSY "4A50" (HOD) | | SEE HGR DET SH 11 | | A |
| | 18 | NA | | TYPE 4 HANGER SUPPORT | STEEL | MIL-S-20166 TY U, GR N | 256372 SH 10 ASSY "4A50" | | SEE HGR DET SH 13 | 12 | A |

216357

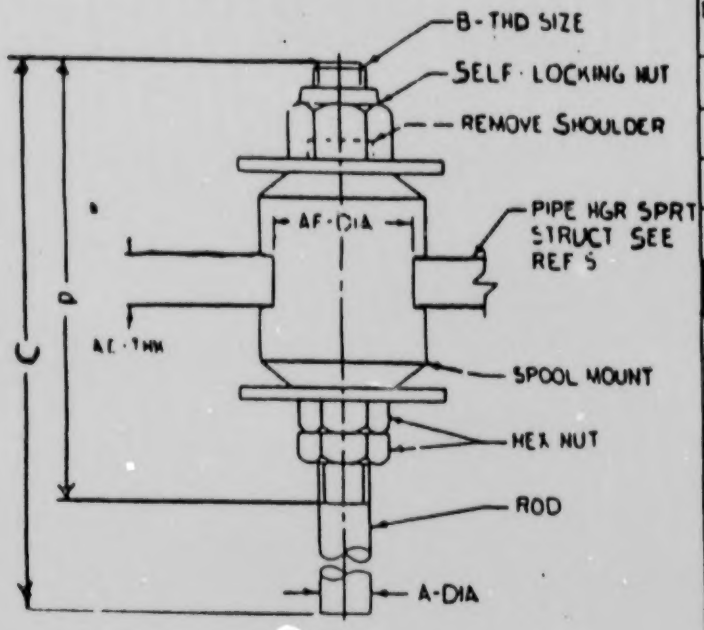
NEWPORT NEWS SHIPBUILDING AND DRY DOCK COMPANY
NEWPORT NEWS, VIRGINIA
A COMPANY

# RESILIENT MOUNTS FOR PIPE HANGERS ASSEMBLY AND DETAILS

RESIL MT F/PIPE HGR ASSY & DET

## NOTES

1. Find assy. No. 97A, and read across.
2. Size 50 lb. spool MT, Pc no. 76 in L/M.
3. Self LKG nut Pc. No. 3 in L/M.
4. Hex Nut Pc. No. 12 in L/M.
5. Rod says see sheet 28 procede to that page.




DETAIL-A
UNBONDED SPOOL MOUNTS

TABLE I UNBONDED SPOOL MOUNTS DETAIL-A

| REV | ASSY NO | SPOOL MOUNT SIZE | SPOOL MOUNT PC NO | SPOOL MOUNT QTY | ROD SEE SHT 28 PC NO | ROD SEE SHT 28 QTY | SELF-LOCKING NUT PC NO | SELF-LOCKING NUT QTY | HEX NUT PC NO | HEX NUT QTY | DESIGN DIMENSIONS AE | DESIGN DIMENSIONS AF | REMARKS | NNPN/SYM NO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H | 96A | 8M | 14 | 1 | 31 | 1 | 1 | 1 | 10 | 2 | 1/8 | 5/8 | | 1740815 |
| | 97B | | | | 46 | | 55 | | 64 | | | | SEE NOTE 7 | 1740816 |
| | 98A | 150 | 75 | | 30 | | 2 | | 11 | | 3/16 | 1/8 | | 1740783 |
| | 98B | | | | 47 | | 56 | | 65 | | | | SEE NOTE 7 | 1740818 |
| | 97A | 50M | 76 | | 29 | | 3 | | 12 | | 5/16 | 1-1/16 | | 2406011 |
| | 97B | | | | 48 | | 57 | | 66 | | | | SEE NOTE 7 | 2406010 |
| | 96A | 100M | 77 | | 48 | | 4 | | 13 | | 1/16 | 1-1/16 | | 2406009 |
| | 96B | | | | 49 | | 58 | | 67 | | | | SEE NOTE 7 | 2406008 |
| | 95A | 200M | 78 | | 41 | | 5 | | 14 | | 1/16 | 1-1/16 | | 1740714 |
| | 95B | | | | 50 | | 58 | | 68 | | | | SEE NOTE 7 | 1740757 |
| J | 96C | 100M | 77 | 1 | — | — | 4 | 1 | — | — | 1/16 | 1 3/16 | | 2407648 |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

| NOTES |
|---|
| 1. Pc No. 39 on rod table. |
| 2. All dimensions are located to the left of table. |
| 3. Example A = 3/8 Dia. |
| 4. All items found in list of material Pc No:s 3, 12, 39, and 76. |

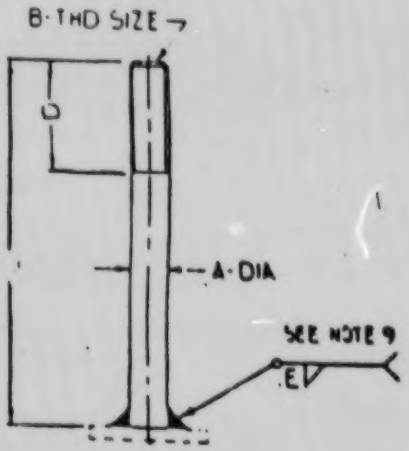


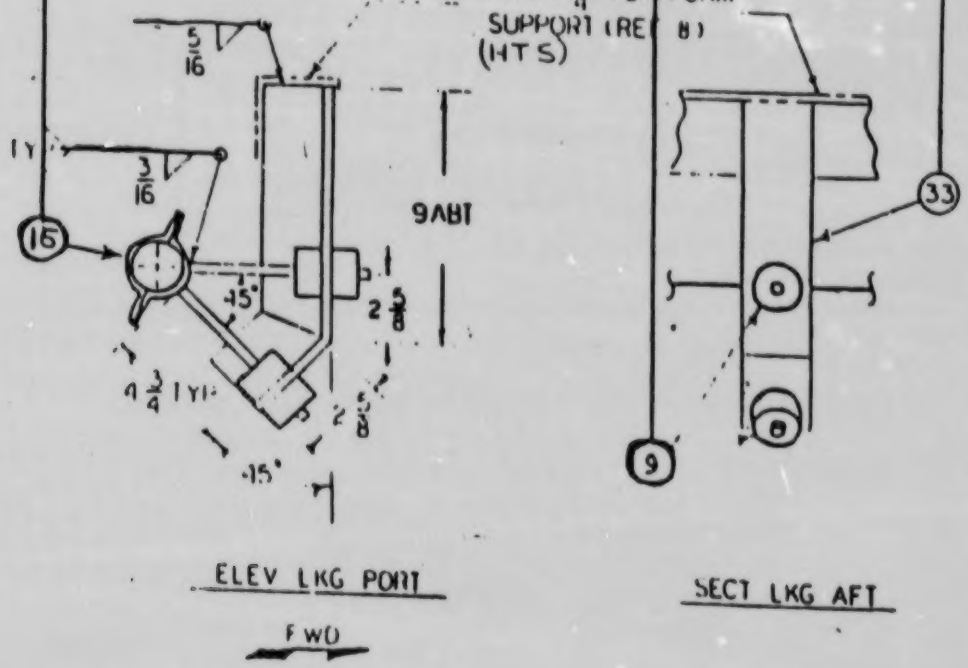

TABLE 6 RODS

| PC NO | DIMENSIONS A | B | C | D | E | NNPN/ SYM NO | REV |
|---|---|---|---|---|---|---|---|
| 37/46 | 1/4 | 1/4-20 UNC-2A | 18 | 0 | 3/16 | 1740311 | H |
| | | | | | | 1740320 | |
| 38/47 | 5/16 | 5/16-18 UNC-2A | | 0 | 3/16 | 1740312 | |
| | | | | | | 1740573 | |
| 39/48 | 3/8 | 3/8-16UNC-2A | | 12 | 3/16 | 1740313 | |
| | | | | | | 1740321 | |
| 40/49 | 1/2 | 1/2-13 UNC-2A | | 11 | 1/4 | 1740314 | |
| | | | | | | 1740322 | |
| 41/50 | 5/8 | 5/8-11 UNC-2A | | 12 1/2 | 5/16 | 1740315 | |
| | | | | | | 1740323 | |
| 42/51 | 3/4 | 3/4-10 UNC-2A | | 17 | 5/16 | 1740316 | |
| | | | | | | 1740324 | |
| 43/52 | 1 | 1-8 UNC-2A | | 17 | 3/8 | 1740317 | |
| | | | | | | 1740325 | |
| 44/53 | 1-1/4 | 1-1/4-7 UNC-2A | | 17 | 1/2 | 1740318 | |
| | | | | | | 1740326 | |
| 45/54 | 1-1/2 | 1-1/2-6 UNC-2A | | 17 | 1/2 | 1740319 | |
| | | | | | | 1740327 | |

LIST OF MATERIAL

| PC NO | QTY | DESCRIPTION | MATL | MATL SPEC | EQPT SPEC OR DWG NO | REMARKS | NNPN/SYM NO | REV |
|---|---|---|---|---|---|---|---|---|
| 3 | - | 3/8 - 16 UNC - 3B | STEEL CD-PLD | - | - | - | - | |
| 12 | - | 3/8 - 16 UNC - 2B | STEEL ZINC PLD | - | - | - | - | |
| 39 | - | 3/8 - | STEEL | - | SEE SH 28 | - | - | |
| 76 | - | 50# UNBONDED SPOOL RESILIENT MOUNT | VARIOUS | - | - | - | - | |

# HANGERS H5




| HANGER H5 CONSISTING OF: | | | |
|---|---|---|---|
| ITEM NO | QTY | L/M SHAPE | REMARKS |
| 9 | 2 | 6 | |
| 16 | 1 | 6 | |
| 33 | 1 | 7 | SEE NOTE 6 |

NOTES

1. Remember your theory.
2. Item 16 consists of (clamp halves) (liner) and (nut and bolt)
3. For further information go to Ref. block in upper right hand corner of this page.
4. Go to sheet 6 find item 16.

PRIME COAT: ZINC CHROMATE SEE NOTE 16

| HULL NO. | DWG NO. | REV |
|---|---|---|
| NAVSHIPS 516-45549-5 | SHEET 12 OF | |

## NOTES

1. L/M gives you description and Ref. drawings.
2. The description of Item 16 is type 1 strap hanger.
3. For further Information go to Ref. block for plan numbers and assy. for detail of strap hanger.
4. Ref. Dwg. 255454 SH 14 Assy. E.
5. Proceed to proper drawing and assy.

LIST OF MATERIAL — QUANTITIES ARE FOR ONE

| SEE DET | ASSY NO ITEM NO | RIG LVL | ZONE | DESCRIPTION | MAT'L | MAT'L SPEC | REF DWG | NH STK OR STOCK NO | REMARKS | NOISE CONT (SEE NOTE) | REV |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | NA | | TYPE 6 RUBBER BLOCK 3/4 THK | STN RUBBER | MIL-S-6855 CL II | 255454 SH 20, PC 2 | | SEE DETAIL SH 32 | | A |
| | 2 | NA | | 100# UNBONDED SPOOL MOUNT ASST | VARIOUS | ——— | 218357 SH 18 ASST "96A" | | | | A |
| | 3 | NA | | TYPE 4 HANGER SUPPORT (HOD) | STEEL | MIL-S-20188 IT W, GR H | 256372 SH 10 ASST 4A100 (HOD) | | SEE HGR DET SH 16 & 17 | | A |
| | 4 | NA | | 50# UNBONDED SPOOL MOUNT ASST | VARIOUS | ——— | 218357 SH 18 ASST "97B" | | | | A |
| | 5 | NA | | TYPE 1 HANGER SUPPORT | STEEL | QQ-S-741 | 256372 SH 118 ASST "1A50" | | | | A |
| | 6 | NA | | TYPE 1 STRAP HANGER | VARIOUS | ——— | 255454 SH 14 ASST "AE" | | | | A |
| | 7 | NA | | TYPE 7 HANGER SUPPORT | STEEL | VARIOUS | 256372 SH 131 ASST "7H50" | | SEE HGR DET SH 14 & 20 | | A |
| | 8 | NA | | TYPE 3 HANGER SUPPORT | STEEL | MIL-S-20188 IT W, GR H | 256372 SH 8 ASST "3B50" | | | | A |
| | 9 | NA | | 50# UNBONDED SPOOL MOUNT ASST | VARIOUS | ——— | 218357 SH 18 ASST "97A" | | | | A |
| | 10 | NA | | TYPE 1 STRAP HANGER | VARIOUS | ——— | 255454 SH 14 ASST "F" | | | | A |
| | 11 | NA | | TYPE 7 HANGER SUPPORT | STEEL | ——— | 256372 SH 131 ASST "7G50" | | SEE HGR DET SH 18, 19 & 19 | | A |
| | 12 | NA | | TYPE 3 HANGER SUPPORT | STEEL | QQ-S-741 | 256372 SH 8 ASST "3A50" | | | | A |
| | 13 | NA | | TYPE 13 HANGER ASST | VARIOUS | ——— | 255454 SH 34 ASST "AF" | | | | A |
| | 14 | NA | | 50# UNBONDED SPOOL MOUNT ASST | VARIOUS | ——— | 255454 SH 55 ASST "FB" | | | | A |
| | 15 | NA | | TYPE 3 HANGER SUPPORT | STEEL | QQ-S-741 | 256372 SH 10 ASST "4A50" | | SEE HGR DET SH 25 | | A |
| → | 16 | NA | | TYPE 1 STRAP HANGER | VARIOUS | | 255454 SH 14 ASST "E" | | | | A |
| | 17 | NA | | TYPE 4 HANGER SUPPORT (HOD) | STEEL | QQ-S-741 | 256372 SH 10 ASST "4A50" (HOD) | | SEE HGR DET SH 11 | | A |
| | 18 | NA | | TYPE 4 HANGER SUPPORT | STEEL | MIL-S-20188 IT W, GR H | 256372 SH 10 ASST "4A50" | | SEE HGR DET SH 13 | | A |

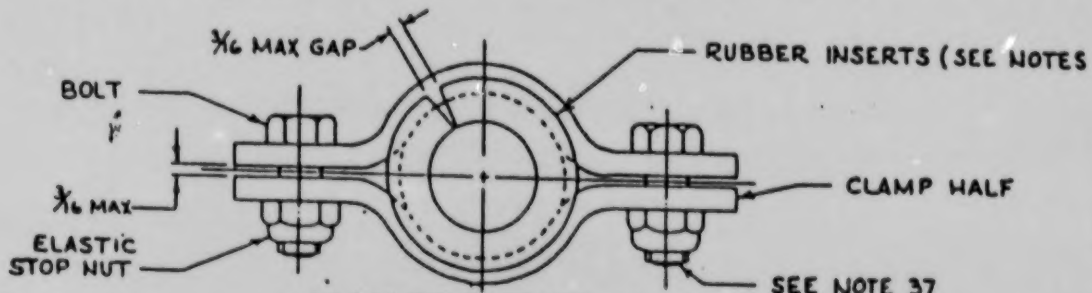
255454

# ASSEMBLIES FOR STRAP HANGERS

TEMPERATURES 250°F AND LESS

| NOMINAL PIPE SIZE | STEEL ASSY | STEEL NNPN FOR ASSY | STEEL PC NO. CLAMP HALF SH 15 (2 REQD) | STEEL PC NO. RUBBER INSERT SH 16 (1 REQD) | STEEL PC NO. BOLT SH 10 (2 REQD) | STEEL PC NO. NUT SH 9 (2 REQD) | STEEL (ZINC COATED) ASSY | STEEL (ZINC COATED) NNPN FOR ASSY | STEEL (ZINC COATED) PC NO. CLAMP HALF SH 15 (2 REQD) | STEEL (ZINC COATED) PC NO. RUBBER INSERT SH 16 (1 REQD) | STEEL (ZINC COATED) PC NO. BOLT SH 11 (2 REQD) | STEEL (ZINC COATED) PC NO. NUT SH 9 (2 REQD) | CRES ASSY | CRES NNPN FOR ASSY | CRES PC NO. CLAMP HALF SH 15 (2 REQD) | CRES PC NO. RUBBER INSERT SH 16 (1 REQD) | CRES PC NO. BOLT SH 11 (2 REQD) | CRES PC NO. NUT SH 9 (2 REQD) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/4 | A | 2403243 | 151 | 451 | 51 | 28 | AA | 2403257 | 201 | 451 | 74 | 33 | BA | 2403268 | 301 | 451 | 74 | 33 |
| 3/8 | B | 244 | 152 | 452 | 51 | 28 | AB | 2409186 | 202 | 452 | 74 | 33 | BB | 2409197 | 302 | 452 | 74 | 33 |
| 1/2 | C | 245 | 153 | 453 | 52 | 29 | AC | 2403258 | 203 | 453 | 75 | 34 | BC | 2403269 | 303 | 453 | 75 | 34 |
| 3/4 | D | 246 | 154 | 454 | | | AD | 2409187 | 204 | 454 | | | BD | 2409198 | 304 | 454 | | |
| 1 | E | 247 | 155 | 455 | | | AE | 2403259 | 205 | 455 | | | BE | 2403270 | 305 | 455 | | |
| 1 1/4 | F | 248 | 156 | 456 | | | AF | 2409188 | 206 | 456 | | | BF | 2409199 | 306 | 456 | | |
| 1 1/2 | G | 249 | 157 | 457 | 53 ⊖ | | AG | 2403260 | 207 | 457 | 76 ⊖ | | BG | 2403271 | 307 | 457 | 76 ⊖ | |
| 2 | H | 250 | 158 | 458 | 54 | | AH | 261 | 208 | 458 | 77 | | | | | | | |
| 2 1/2 | J | 251 | 159 | 403 | 55 | 30 | AJ | 262 | 209 | 403 | 78 | 35 | | | | | | |
| 3 | K | 252 | 160 | | | | AK | 263 | 210 | | | | | | | | | |
| 3 1/2 | L | 253 | 161 | | | | AL | 2409189 | 211 | | | | | | | | | |
| 4 | M | 254 | 162 | | | | AM | 2403264 | 212 | | | | | | | | | |
| 5 | N | 255 | 163 | | | | AN | 265 | 213 | | | | | | | | | |
| 6 | P | 2403330 | 164 | | 56 | 31 | AP | 266 | 214 | | 79 | 36 | | | | | | |
| 8 | R | 2403256 | 165 | | 56 | 31 | AR | 267 | 215 | | 79 | 36 | | | | | | |

⊖ PC NO 52 & 75 MAY BE SUBSTITUTED FOR PC NO 53 & 76, RESPECTIVELY.




HANGER TYPE No 1

## NOTES

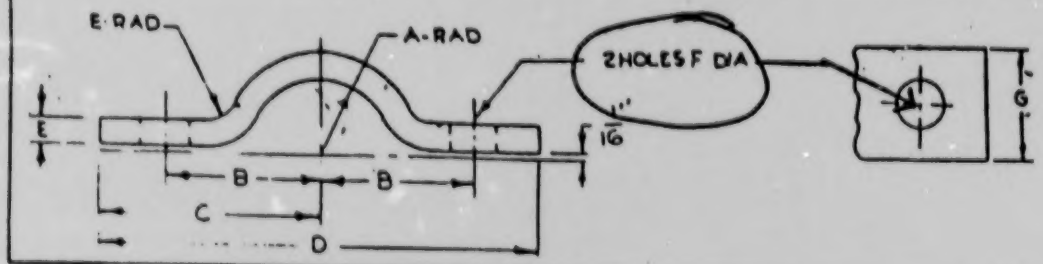
1. Find assy. E.
2. Assy. E IPS size is 1".
3. Clamp half (Pc No. 155) see sheet 15.
4. Rubber insert Pc. No 455 (liner) see sheet 16.
5. Bolt Pc. No 52 see sheet 10.
6. nut Pc. No. 29 see sheet 9.

NOTE: Remember the Pc. No. before going to another sheet.

SHEET 14

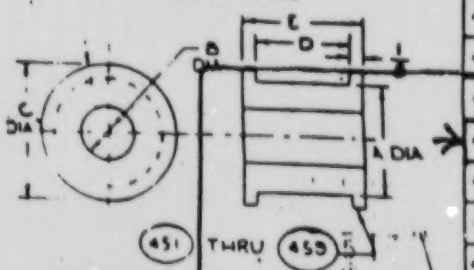
# CLAMP HALF

| NOM PIPE SIZE | MATERIAL: STEEL PC NO | STEEL MATL SPEC | STEEL RAW MATL SOURCE | STEEL NN SYMBOL OR STOCK NO | STEEL/ZINC COATED PC NO | STEEL/ZINC COATED MATL SPEC | STEEL/ZINC COATED RAW MATL SOURCE | STEEL/ZINC COATED NN SYMBOL OR STOCK NO | CRES PC NO | CRES MATL SPEC | CRES RAW MATL SOURCE | CRES NN SYMBOL OR STOCK NO | MIN ORD QTY | DIMENSIONS A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ¼ | 151 | QQ S 698 | 97-20-250 | | 201 | QQ-S-698 | 97-20-250 | | 301 | QQ S 766c CL 321 CONDN A | 97-34-084 | | 4½ | 33/64 | 1⅛ | 1⅜ | 3½ | ⅛ | 3/16 | 5/16 |
| ⅜ | 152 | | | | 202 | | | | 302 | | | | 4½ | 13/32 | 1¼ | 1¾ | 3½ | ¼ | 1/4 | 5/16 |
| ½ | 153 | | -251 | | 203 | | -251 | | 303 | QQ-S-763 CL 304 CONDN A | 97-34-596 | | 5½ | 41/64 | 1⅜ | 2 | 4 | ⅜ | 5/16 | 1 |
| ¾ | 154 | | | | 204 | | | | 304 | | | | 5½ | 49/64 | 1½ | 2½ | 4½ | ⅜ | 3/8 | 1 |
| | 155 | | | | 205 | | | | 305 | | | | 6 | 29/32 | 1⅝ | 2¼ | 4½ | 3/16 | 7/16 | 1 |
| 1¼ | 156 | QQ S 741 | -31-301 | | 206 | QQ-S-741 | -31-301 | | 306 | | -620 | | 6½ | 1¼ | 1⅝ | 2½ | 6 | ½ | ½ | 1 |
| 1½ | 157 | | | | 207 | | | | 307 | | | | 7 | 1⅜ | 2 | 2½ | 5½ | ½ | ½ | 1 |
| 2 | 158 | | | | 208 | | | | 308 | | | | 8 | 1⅝ | 2½ | 2⅞ | 5½ | ½ | ½ | 1 |
| 2½ | 159 | | -304 | | 209 | | -304 | | 309 | | -628 | | 9 | 1¾ | 2¾ | 3⅛ | 6½ | ⅝ | 11/16 | 1½ |
| 3 | 160 | | | | 210 | | | | 310 | | | | 10 | 2 | 2⅞ | 3½ | 7½ | ¾ | ¾ | 1½ |
| 3½ | 161 | | | | 211 | | | | 311 | | | | 10½ | 2½ | 3⅛ | 3⅞ | 7½ | ¾ | ⅞ | 1½ |
| 4 | 162 | | | | 212 | | | | 312 | | | | 11½ | 2½ | 3¾ | 4½ | 8½ | ¾ | 15/16 | 1½ |
| 5 | 163 | | | | 213 | | | | 313 | | | | 13 | 3⅛ | 4 | 4¾ | 9½ | ¾ | ⅞ | 1½ |
| 6 | 164 | | -305 | | 214 | | -305 | | 314 | | -642 | | 16 | 3¾ | 4⅞ | 5¾ | 11½ | ⅞ | 1 1/16 | 1½ |
| 8 | 165 | | | | 215 | | | | 315 | | | | 19 | 4¾ | 5½ | 6¾ | 13½ | ⅞ | 1 1/16 | 1½ |




## NOTES

1. Pc No. 155 1" IPS
2. Read to dimensions table
3. Dimensions are lettered to go with diagram below.
4. Example 2 holes F dia. F= 7/16
5. Go to Sheet 16 find item 455




## RUBBER GROMMET INSERTS 180°F MAX.

| PC NO. | PIPE SIZE | MATERIAL | MATERIAL SPEC | RAW MATL SOURCE | NN SYM OR STOCK NO | DIMENSIONS A | B | C | D | E | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 451 | 1/4 | RUBBER SYNTHETIC | MIL-S-6855 CL II 60 DUR | — | 97-79-070 | 25/32 | 1/2 | 1 | 3/8 | 3/4 | 401 MAY BE SUBSTITUTED 100°F & LESS |
| 452 | 3/8 | | | — | 97-79-071 | 15/16 | 11/16 | 1 3/16 | | | |
| 453 | 1/2 | | | — | 97-79-072 | 1 11/32 | 27/32 | 1 5/8 | 1 | 1 1/4 | 402 MAY BE SUBSTITUTED 100°F & LESS |
| 454 | 3/4 | | | — | 97-79-073 | 1 9/16 | 1 1/16 | 1 15/16 | | | |
| 455 | 1 | | | — | 97-79-074 | 1 15/16 | 1 5/16 | 2 1/16 | | | |
| 456 | 1 1/4 | | | — | 97-79-080 | 2 5/32 | 1 11/16 | 2 7/16 | | | |
| 457 | 1 1/2 | | | — | 97-79-076 | 2 7/16 | 1 29/32 | 2 11/16 | | | |
| 458 | 2 | | | — | 97-79-077 | 2 29/32 | 2 3/8 | 3 1/8 | | | |
| 459 | 2 1/2 OD | | | — | 97-79-078 | 1/2 | 1/4 | 3/4 | 5/8 | 5/8 | |
| 460 | 1/4 | | | — | 97-79-081 | 11/16 | 5/16 | 1 1/16 | 7/8 | 7/8 | |

DWG NO. 255454 REV.

SHEET 16

### NOTES

1. PC. No. 455 is a 1" grommet.
2. Dimensions are lettered by size.
3. Example: B dia. = 1 5/16.
4. PC. No. 29 sheet 9.
5. Pc. No. 52 sheet 10.

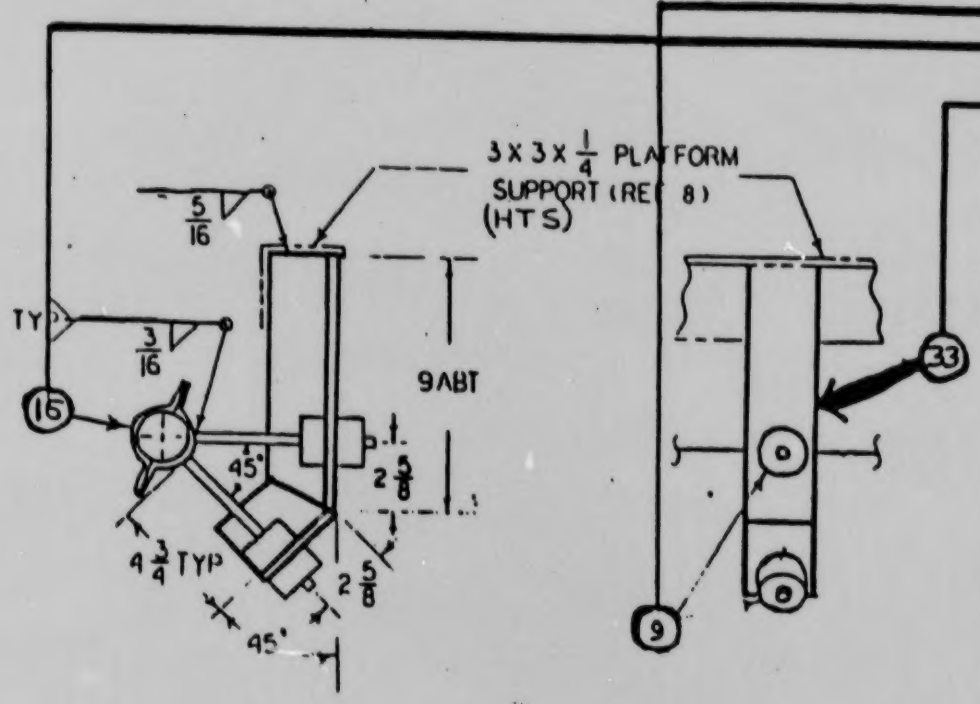
## SHEET 9 LIST OF MATERIAL

| PC NO | QUANTITY OF MATL | DESCRIPTION | MATERIAL | MATL SPEC | RAW MATL SOURCE | NN SYMBOL OR STOCK NO. | REMARKS |
|---|---|---|---|---|---|---|---|
| 24 | LG AS SHOWN | MULTIPLE STRAP HANGER 1 1/16 | STEEL - ZINC PLATED | QQ-S-645 | 97-20-251 | — | FOR HGR TYPE SEE S |
| 25 | | 1 1/4 | | QQ-S-741 | 97-31-301 | — | |
| 26 | | 1 1/4 x 1/4 | | | 97-31-304 | — | |
| 27 | — | HEX NUT SELF LOCKING 1/4-20 UNC-2B | STEEL A CD PLD | MIL-N-25027 | — | 97-64-224 | MS 18090 CLASS 3B SEE NOTE 36 |
| 28 | — | 5/16-18 UNC-2B | | | — | 97-64-225 | FIT MAY BE SUBSTITUT |
| 29 | — | 3/8-16 UNC-2B | | | — | 97-64-226 | |

## SHEET 10 LIST OF MATERIAL

| PC NO | QUANTITY OF MATL | DESCRIPTION | MATERIAL | MATL SPEC | RAW MATL SOURCE | NN SYMBOL OR STOCK NO. | REMARKS |
|---|---|---|---|---|---|---|---|
| 47 | LG 2 1/2 | HEX HEAD BOLT 1/4-20 UNC-2A | STEEL ZINC PLD | MIL-B-8879A GR 2 TY II | — | 97-60-410 | |
| 48 | 2 3/4 | | | | SY'97-LC-411 | — | CUT FROM LG 3" |
| 49 | " | 5/16-18 UNC-2A | | | — | 97-60-435 | |
| 50 | 3 1/2 | | | | — | 97-60-436 | |
| 51 | " | 3/8-16 UNC-2A | | | — | 97-60-415 | |
| 52 | 1/4 | 1/2-13 UNC-2A | | | — | 97-60-427 | |

# HANGERS H5




ELEV LKG PORT

FWD

SECT LKG AFT

HANGER H5 CONSISTING OF:

| ITEM NO | QTY | L/M SHT | REMARKS |
|---|---|---|---|
| 9 | 2 | 6 | |
| 16 | 1 | 6 | |
| 33 | 1 | 7 | SEE NOTE 6 |

NOTES

1. Item 33 is a support.
2. For details of support go to SH 7 in list of material. Look up item 33.
3. Item 33 says look in plan 256372 assy. 4A50 on sheet 10 for details.
4. Proceed to proper plan and sheet and assy.

PRIME COAT: ZINC CHROMATE SEE NOTE 16

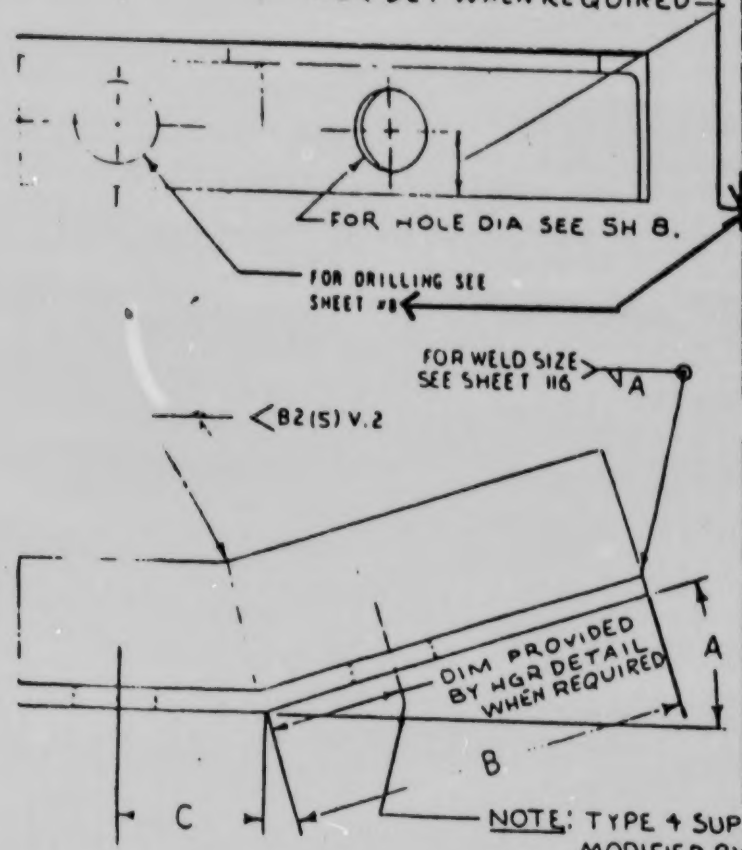
| HULL NO. | DWG. NO. 355-202 | REV F |
|---|---|---|
| NAVSHIPS 516-4554955 | SHEET 2 OF ___ | |

| QTY | ASSY NO | ITEM NO | BIC LVL | ZONE | DESCRIPTION | MATL | MATL SPEC | REF DWG | MN STK OR STOCK NO | REMARKS | NOISE CONT (SEE NOTE) | REV |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 33 | M4 | | TYPE 4 HANGER SUPPORT (NOD) | STEEL | 00-S-741 | 256372 SH 10 ASSY 4A50 (NOD) | | SEE HGR DET SH 12 | | A |

LIST OF MATERIAL — QUANTITIES ARE FOR ONE

# TYPE 4 SUPPORT

| ANGLE TOTAL LG | ASSY NO. | ANGLE BAR SIZE | ANGLE BAR PC NO. SH 5 | A ANGLE | B DIM | C DIM | REMARKS |
|---|---|---|---|---|---|---|---|
| B+C+3/4 | 4A15 | 2X2X1/4 | 5 | | | | THE SUM OF B & C DIM NOT TO EXCEED 14 |
| B+C+3/4 | 4B15 | 2"X2"X1/4 | 6 | | | | THE SUM OF B & C DIM NOT TO EXCEED 14 |
| B+C+3/4 | 4C15 | 3X3X1/4 | 7 | | | | THE SUM OF B & C DIM NOT TO EXCEED 14 |
| B+C+1 | 4A50 | $2\frac{1}{2}\times2\frac{1}{2}\times\frac{1}{8}$ | 8 | TO BE DETERMINED BY ARR PLAN | TO BE DETERMINED BY ARR PLAN | TO BE DETERMINED BY ARR PLAN | THE SUM OF B & C DIM NOT TO EXCEED 14 |
| B+C+1 | 4B50 | 3X3X3/8 | 9 | | | | THE SUM OF B & C DIM NOT TO EXCEED |
| B+C+1 | 4C50 | 3"X3"X3/8 | 10 | | | | THE SUM OF B & C DIM NOT TO EXCEED |
| B+C+1 1/4 | 4A100 | $3\frac{1}{2}\times3\frac{1}{2}\times\frac{1}{2}$ | 12 | | | | THE SUM OF B & C DIM NOT TO EXCEED |
| B+C+1 1/4 | 4B100 | 4X4X$\frac{1}{2}$ | 13 | | | | THE SUM OF B & C DIM NOT TO EXCEED |
| B+C+1 1/2 | 4A200 | 4X4X$\frac{5}{8}$ | 14 | | | | THE SUM OF B & C DIM NOT TO EXCEED |
| B+C+1 1/2 | 4B200 | 5X5X$\frac{5}{8}$ | 16 | | | | THE SUM OF B & C DIM NOT TO EXCEED |




NOTES

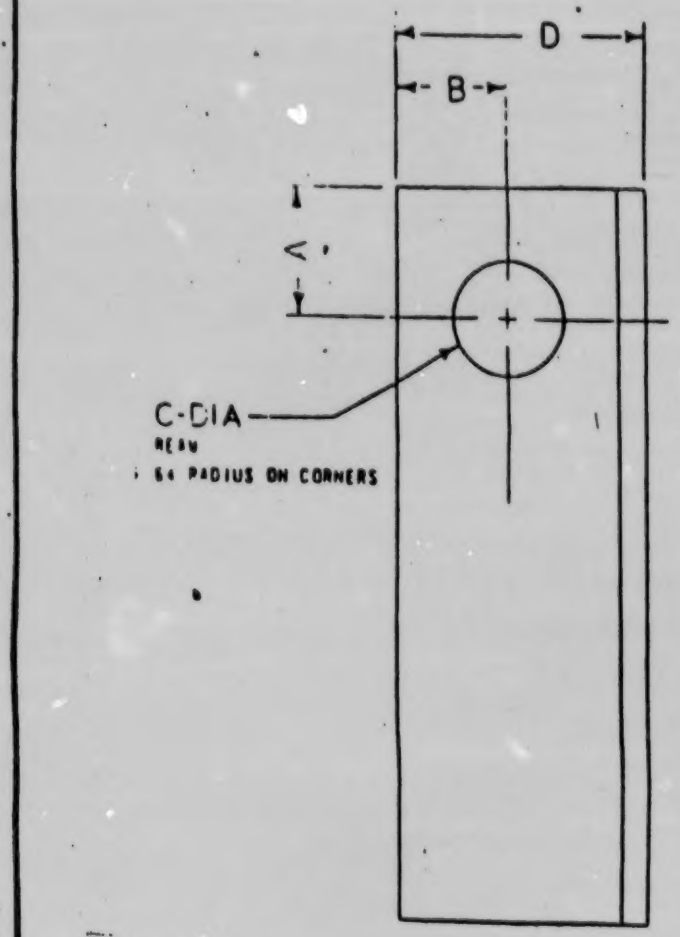
1. Go to Sheet 8 for drilling instructions.

NOTE: Always read information around the diagrams given.

NOTE: TYPE 4 SUPPORT STRUCTURE MAY BE MODIFIED BY DRILLING HOLE WHEN REQUIRED BY HANGER DETAIL.



SHEET 10




SH 5 PC NO 8

| | | |
|---|---|---|
| 8 | ANGLE BAR 2½x2½x⅜ | STL |

## SUPPORT DRILLING

| MOUNT SIZE | PC NO. SH 5 | SUPPORT | DIMENSIONS A-DIM | B-DIM | C-DIA | D-DIM |
|---|---|---|---|---|---|---|
| 15# | 5 | 2 X 2 X 1/4 | 3/4 | 7/8 | 7/8 | 2 |
| 15# | 6 | 2½ X 2½ X 1/4 | 3/4 | 1 1/8 | 1 1/8 | 2 1/2 |
| 15# | 7 | 3 X 3 X 1/4 | 3/4 | 1 3/8 | 1 3/8 | 3 |
| 50# | 8 | 2½x2½x 3/8 | 1 | 1 1/16 | 1 1/4 | 2½ |
| 50# | 9 | 3 X 3 X 3/8 | 1 | 1 5/16 | 1 1/4 | 3 |
| 50# | 10 | 3½ X 3½ X 3/8 | 1 | 1 9/16 | 1 1/4 | 3 1/2 |
| 100# | 11 | 3 X 3 X 1/2 | 1 1/4 | 1 1/4 | 1 7/16 | 3 |
| 100# | 12 | 3½x3½x 1/2 | 1 1/4 | 1 1/2 | 1 7/16 | 3 1/2 |
| 100# | 13 | 4 X 4 X 1/2 | 1 1/4 | 1 3/4 | 1 7/16 | 4 |
| 200# | 14 | 4 X 4 X 5/8 | 1 1/2 | 1 11/16 | 1 13/16 | 4 |
| ~~200#~~ | ~~15~~ | ~~5 X 5 X 5/8~~ | ~~1 1/2~~ | ~~1 11/16~~ | ~~1 13/16~~ | ~~5~~ |
| 200# | 16 | 5X 5 X 5/8 | 1 1/2 | 2 3/16 | 1 13/16 | 5 |

NOTES

1. Always check your item No. in list of material.
2. Pc. No. 8 Sheet 5
3. Proceed to proper sheet and Pc. No.

MULL NO. DW6 256372
REV: B SH 8

## STUDENT MATERIAL LIST

| ITEM | QTY | MATL | TYPE SIZE | REMARKS |
|---|---|---|---|---|
| | | | CLAMP OR BLOCK ASSEMBLY | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | RESILIENT MOUNT ASSEMBLY (IF REQUIRED) | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | SUPPORT ASSEMBLY | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

B-28 Pipehanger Blueprint Reading

Lesson 2

Materials Req.

Dwgs. 256372 R/F, 216357 R/M, 255454 R/L, 256373 R/F, 2285-213 R/F

Student Material List Answer Sheet

Question 1

Using Cross-Referencing System identify all parts of Hanger H-1. List answers in order on answer sheet.

Question 2

Using Cross-Referencing System identify all parts of Hanger H-19. List answers in order on answer sheet.

1. What type and size weld is required to attach pc.80 of hanger CF-H-504 to the ship's structure?

   ANS: 9/16" fillet weld, far side - single bevel fillet near side TZV.1 backgrind required.

2. How far above the main axis would hanger CF-H-252 be located?

   ANS: 6' 3" above the main axis

3. What is the piece number and what type of piping is being supported by hanger CF-H-173?

   ANS: F-18D, Flex-hose assy

4. How far off vertical must the rod for hanger CF-H-513 be rolled?

   ANS: $30^{O}$

5. What is the minimum lug length for hanger CF-H-549?

   ANS: 4"

6. What type and size weld is required to attach pc.100 to pc.62 on hanger CF-H-177?

   ANS: 3/8" fillet all around

7. How far aft of fr. 96 is hanger CF-H-205 located?

   ANS: 15" aft fr. 96

8. What pipes are being supported by hanger CF-H-205?

   ANS: P57-3, P55-3, and P219-1

9. What is the angle between the rods on hanger CF-H-616?

   ANS: $60^{\circ}$ ($40^{\circ} + 20^{\circ}$)

10. What is the length of item 97 on hanger CF-H-548?

    ANS: 10"

11. What type and size weld would be required to attach item 38 to item 126 on hanger CF-H-205?

    ANS: 3/8" fillet all around

12. How far off the vertical centerline would P58-3 on CF-H-206 be located?

    ANS: 54½"

13. Hanger CF-H-260 supports what pipe?

    ANS: P227-5

14. What is the tolerance for angles given on this hanger plan?

    ANS: $\pm 5^{\circ}$

15. What is the dimension given for the mount from the clamp on the aft leg of hanger CF-H-153?

    ANS: 6½"

16. On hanger CF-H-411 what type and size weld is required to attach pc 15-2 to pc 15-1?

    ANS: 5/16" weld near side only, fillet

17. How far below the main axis would hanger CF-H-295 be located?

    ANS: 1" BMA

18. What is the pipe number and size of the pipe supported by hanger CF-H-569?

ANS: P13-3, 1½" I.P.S.

19. How many degrees will the clamp half be rolled off vertical on hanger CF-H-663?

ANS: 70°

20. What is the overhang allowed for pc 77 to the Bilge Collecting Sump Structure on hanger CF-H-165?

ANS: 1"

21. What type of weld inspection is required to sell the ship's attachment weld on hanger CF-H-191?

ANS: MT required

22. How far below the main axis would hanger CF-H-260 be located?

ANS: 8' 9"

23. Hanger CF-H-354 supports what type of piping?

ANS: Capillary tubing

24. What is the angle required for item 32 on hanger CF-H-174?

ANS: 30°

25. What is the length of item 85 on the inboard leg of CF-H-167?

ANS: 8¼"

Lesson 4 (cont.)

11. H-154
    Ans.

12. H-35
    Ans.

13. H-3
    Ans.

14. H-17
    Ans.

15. H-186
    Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson No. 4

Materials Required:
Dwgs. 2744-51 R/J, 2744-33 R/H

Instructions:
Give all locations for the following hangers. (Port/Stbd. of Centerline, Fwd./Aft of Frame Abv./Blw Main Axus or ABL

1. H-106
Ans. 9-3/4"fwd. Fr.115, 27½"Port, 59"BMA

2. H-85
Ans. 64"port, 14"Aft Fr.115, 46½"AMA

3. H-139
Ans. 3"fwd. Fr.114, 6'9"Stbd., 11'6" AMA

4. H-183
Ans. 25½"Port, 8½"Aft Fr.106, 8'11½"BMA

5. H-5
Ans. 6'10"Port, 9"Aft Fr.99, 6'10½"BMA

6. H-111
Ans. 3"Aft Fr.114, 22"Stbd, 60"BMA

7. H-7
Ans. 12'5"Port, 7'0½"BMA, 17"Aft Fr.99

8. H-30
Ans. 56"Port, 13½"Fwd Fr. 112, 62-3/4"BMA

9. H-149
Ans. 8'3"AMA, 13'1½"Stbd, 11"Fwd. Fr.103

10. H-88
Ans. $\mathcal{C}_L$ Fr.117, 10'7"Port, 44"AMA

Lesson 4 (cont.)

11. H-154
Ans. 7"Port, 15'6"AMA, 6"Fwd Fr.101

12. H-35
Ans. 26½"AMA, 4"Fwd Fr.112, 13'9"Port

13. H-3
Ans. 11½"Aft Fr.99, 28"Port, 8'10"BMA

14. H-17
Ans. 9"Fwd Fr.107, 22"Port, 13'13½"BMA

15. H-186
Ans. 5"Stbd, 14'1-3/4"AMA, 13-3/4"Fwd Fr.109

B-28 PIPEHANGER BLUEPRINT READING

Lesson No. 5

Materials Required:
Dwgs. 2740-377 R/K

Instructions:
Give all locations for the following hangers.
(Port/Stbd. of Centerline, Fwd./Aft of Frame
Abv./Blw Main Axis or ABL)

1. H-3
Ans.

2. H-6
Ans.

3. H-40 (No Height Dim)
Ans.

4. H-18
Ans.

5. H-32
Ans.

6. H-29
Ans.

7. H-13
Ans.

8. H-49
Ans.

9. H-4
Ans.

10. H-30
Ans.

11. H-39
Ans.

12. H-14
Ans.

13. H-5 (No Height Dim)
Ans.

14. H-20
Ans.

15. H-25

B-28 PIPEHANGER BLUEPRINT READING

Lesson No. 5

Materials Required:
Dwgs. 2740-377 R/K

Instructions:
Give all locations for the following hangers.
(Port/Stbd. of Centerline, Fwd./Aft of Frame
Abv./Blw Main Axis or ABL)

1. H-3
Ans. 12'8-1/8"Port, 8½"Fwd. Fr. 53, 12'11-3/4"ABL

2. H-6
Ans. 16"Fwd Fr. 59, 42"Port, 79"ABL

3. H-40 (No Height Dim)
Ans. 6'6"Port, 10-3/4"Aft Fr.51

4. H-18
Ans. 17"Fwd Fr.62, 7'1"Stbd, 15'2"ABL

5. H-32
Ans. 17"Aft Fr.57, 11'8"Stbd, 15'0-1/4"ABL

6. H-29
Ans. 41-3/4"Aft Fr.51, 11'10"Stbd.,15'0-1/4"ABL

7. H-13
Ans. 22"Aft Fr. 59, 10'2"Stbd, 83"ABL

8. H-49
Ans. 22'1"ABL, 8'9"Stbd,4"Fwd Fr.62

9. H-4
Ans. 3½"Fwd Fr.52, 12'5-1/8"Port, 9'8½"ABL

10. H-30
Ans. 6"Aft Fr.54, 11'10"Stbd, 15'½"ABL

11. H-39
Ans. 10-3/4"Aft Fr.51, 44½"Port, 31'10"ABL

12. H-14
Ans. 22"Fwd.Fr.62, 10'2"Stbd, 7'5½"ABL

13. H-5 (No Height Dim)
Ans. 10½"Fwd Fr.58, 55-5/16"Port

14. H-20
Ans. 9"Fwd Fr.59, 10'9-3/4"Stbd, 8'2"ABL

15. H-25
18"Aft Fr.56, 10'3-3/4"Stbd, 8'2"ABL

B-28 PIPEHANGER BLUEPRINT READING

Lesson No. 6

Materials Required:

Dwgs. 2285-237 R/C, 2285-238 R/C

Instructions:

Give all locations for the following hangers:
(Port/Stbd, of Centerline, Fwd./Aft of Frame
Abv./Blw Main Axis or ABL)

1. H-13
   Ans.

2. H-6
   Ans.

3. H-19
   Ans.

4. H-66
   Ans.

5. H-26
   Ans.

6. H-27
   Ans.

7. H-33
   Ans.

8. H-25
   Ans.

9. H-28
   Ans.

10. H-3
    Ans.

11. H-41
    Ans.

12. H-2
    Ans.

13. H-10
    Ans.

14. H-44
    Ans.

15. H-53
    Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson No. 6

Materials Required:

Dwgs. 2285-237 R/C, 2285-238 R/C

Instructions:

Give all locations for the following hangers: (Port/Stbd, of Centerline, Fwd./Aft of Frame Abv./Blw Main Axis or ABL)

1. H-13 Ans. 10"Aft Fr.91, 11'6"BMA 9'8"Port

2. H-6 Ans. 6"Aft Fr.88, 13'7"BMA, 21½"Stbd

3. H-19 Ans. 6"Aft Fr.108, 14'10"BMA, 18½"Stbd

4. H-66 Ans. 6"Aft Fr.108, 11'6"BMA, 8'0-3/4"Port

5. H-26 Ans. 6"Aft Fr.95, 15'BMA, 17"Port

6. H-27 Ans. 6" Aft Fr.97, 17"Port, 15"BMA

7. H-33 Ans. 9"Aft Fr.99,13'2-3/4"BMA, 7'5"Port

8. H-25 Ans. 6"Fwd Fr.95, 18½"Stbd, 14'10"BMA

9. H-28 Ans. 9"Fwd Fr.97, 14'3"BMA, 18½"Stbd

10. H-3 Ans. 6"Aft Fr.88, 69½"Stbd, 13'7"BMA

11. H-41 Ans. 10"Fwd Fr.102, 7'5"Port, 12'8"BMA

12. H-2 Ans. 47"STBD, 18½"AFT Fr.87, 13'7"BMA

13. H-10 Ans. 7½"AFT Fr.87, 8'5-3/4"BMA, 10'1"PORT

14. H-44 Ans. ℄ Fr.105, 6'7-3/4"PORT, 11'6"BMA

15. H-53 Ans. ℄ Fr.111, ℄ of ship 13'3½"BMA

B-28 PIPEHANGER BLUEPRINT READING

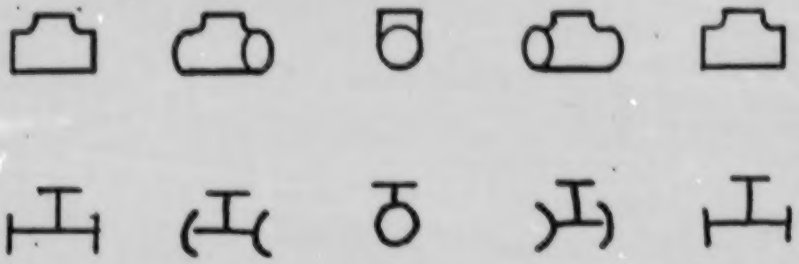
LESSON NUMBER #7

Materials Required:

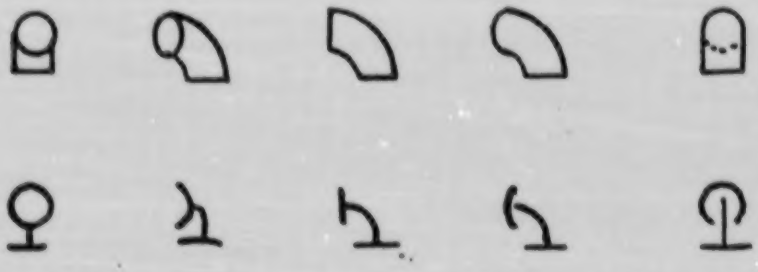
Handout Pipefitter Symbols for Fittings
Handout Pipefitter Blueprint Reference
Dwgs. 2285-237 R/C, 2285-238 R/C

1. Using handouts and blueprints provided, discuss use of piping symbols and references.

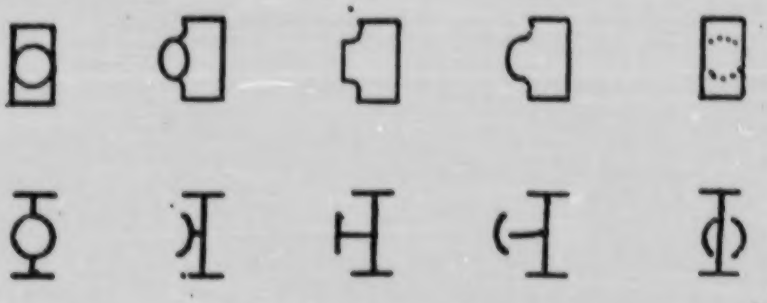
TEE



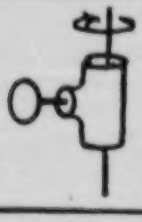
90° ELL

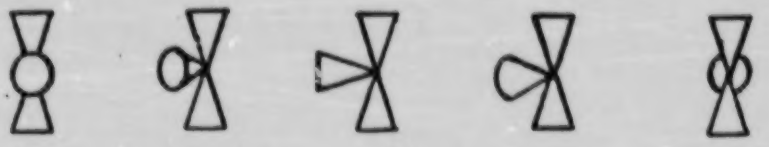


TEE

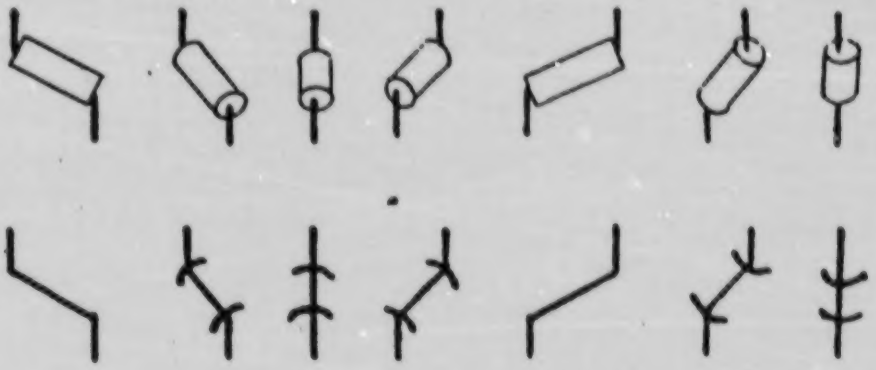


VALVE





OFFSET



TRUE SCALE - means the scale shown the face of the blueprint is 1/2 of the actual scale used.

NON-DETAIL - means that the pipefitter will have to make a template from the plan and the ship.

DATUM LINE-- means it is a reference line; e. g., at a point marked 0' 0", from that point or line.

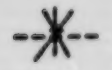
NEAR & FAR - near would be the pipe on a plan that is the closest to you and far is just the opposite.

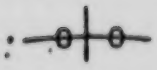
DIA. FORM - is to what diameter the pipe will be bent to.

TR ♦ IPS - is the formula used to compute the diameter form of a pipe bent from the detail plan.

--- - three dashes on a detail plan at the end of the pipe indicates, allowance of three inches at the end of the pipe for tolerences, also at the start of the pipe

-)- -(- - on a plan indicates a bend in the pipe and which direction it is bent in.

 - symbol indicates that there is a hidden bend in the pipe on the plan.

 - indicates two holes up for alignment of a flange.

- indicates one hole up for alignment on a flange.

- indicates a pipe bend on a plan that is bending directly towards you from the plan.

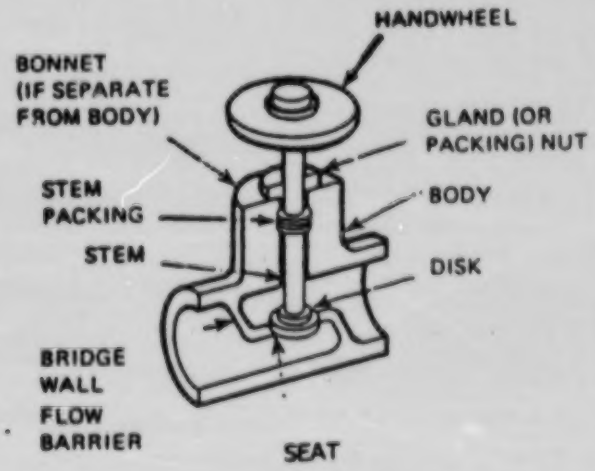
- indicates a pipe bend on a plan that is bending directly away from on the plan.

- indicates direction of flow of fluid on a plan.

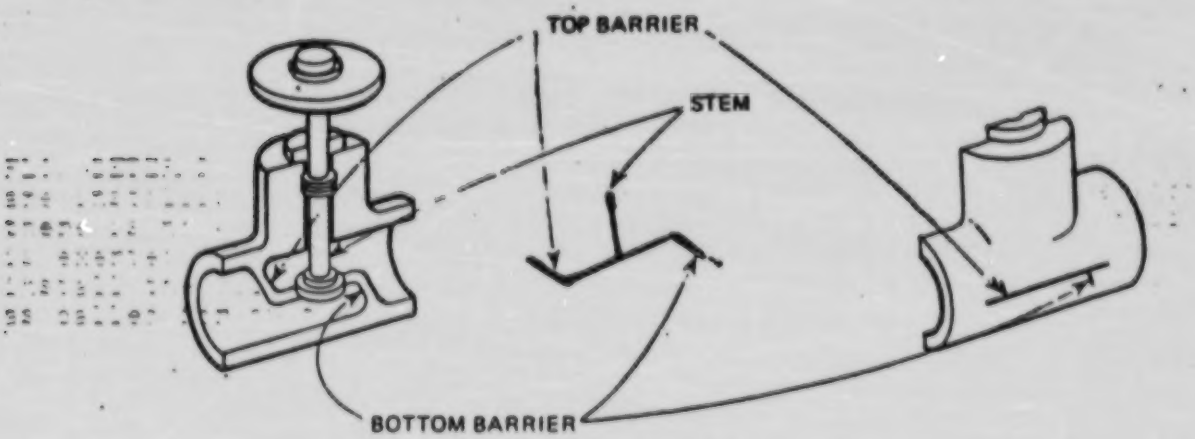
- indicates flow may go in either direction.

This symbol is commonly called a BRIDGE MARK and is found on the blueprint and the Globe Valve body. It is this symbol that is used for orientation of the Globe Valve for installation.

GLOBE VALVE

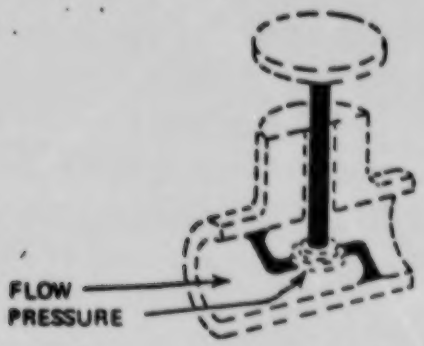



The BRIDGE MARK is nothing more than the internal construction of the Globe Valve - it consists of the Flow Barrier and the Stem.

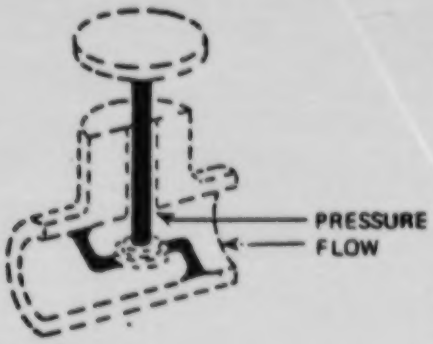



Because the BRIDGE MARK represents the internal construction of the valve, it can be used to orient the valve for installation.

TYPICAL VALVE INSTALLATION is designed so that the fluid flow and pressure act against the seat of the valve.

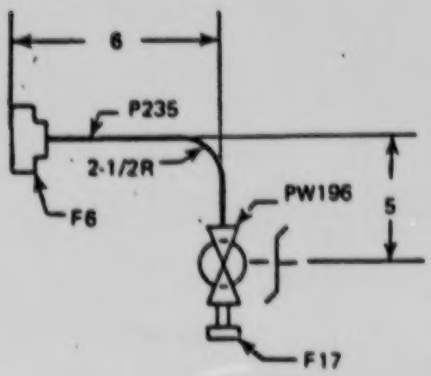


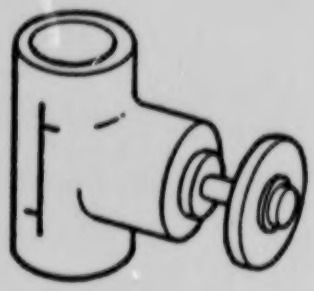

SPECIAL VALVE INSTALLATION is designed so that the fluid flow and pressure act against the packing rather than the seat.



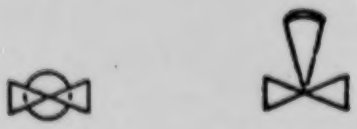

FLOW DETERMINATION - There is no way of knowing if the valve you are installing is a Typical or a Special valve installation, therefore there is no way to know which way the fluid flows or where the pressure is exerted. The only way to ensure proper valve installation is to install the valve with its BRIDGE MARK oriented in the same direction as called for by the blueprint.

The Globe Valve must be installed with its BRIDGE MARK oriented in the same direction as the BRIDGE MARK on the blueprint - REGARDLESS of flow direction or pressure.



NOTE - BRIDGE MARKS are not used to orient the valve handle during installation - the valve symbol is used for this purpose.



If the BRIDGE MARK is missing or incomplete on the:

Valve - stop work and see your supervisor. A BRIDGE MARK MUST be placed on the valve before installation - Lack of a BRIDGE MARK is cause for rejection.

Plan - stop work and see your supervisor. Do not interpret it yourself.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number 8

Materials: Drawing Numbers- 2300-543 R/N, 2300-544 R/P

1. What type and size fitting is F-23 ?

   Ans.

2. How many F-2 fittings are required on this drawing ?

   Ans.

3. What service does HP-368 perform ?

   Ans.

4. What plan would be used to locate the foundation to which HP-362 is attached ?

   Ans.

5. How many ½" flanges are used on these drawings ?

   Ans.

6. What pipes are used to service the Port Torpedo Hoist Cylinder ?

   Ans.

7. What pipes are used to service F-26 ?

   Ans.

8. In what revision was fitting F-8 added ?

   Ans.

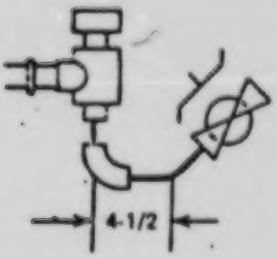
9. F-26 is shown in zone 4 B + C on drawing 2300-544 plan view, what section view also shows F-26 ?

   Ans.

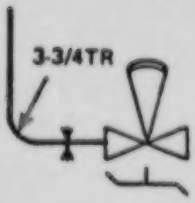
10. In what revision was H-49 added ?

    Ans.

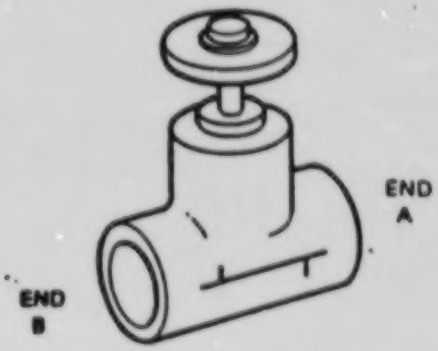
Compare the valve drawing with the four piping details and indicate which end of the valve is fitted to the pipe - End A or End B.

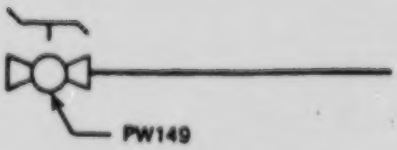
1. 


1.____

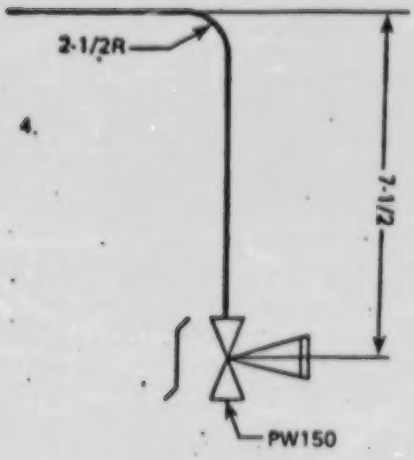
2. 


2.____




3. 


3.____

4. 


4.____

Lesson Number 8 cont.

11. In what revisions were the locations for H-35 + H-36 changed ?
Ans.

12. On what plan would you find the hanger details ?
Ans.

13. What does the symbol (C 2) next to H-38 in the hanger table signify ?
Ans.

14. Where would you find a complete list of notes for drawing 2300-543 ?
Ans.

15. What valve connects to shuttle cylinder No. 2 ?
Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number 9

Materials: Drawing 2300-547x1

1. Is valve HS-33 when installed, locked open or shut ?
   Ans.

2. Does P2538T-½" service HS-41 or HS-42 ?
   Ans.

3. F-6 is a reducing tee, what pipe or pipes does it service ?
   Ans.

4. In what direction is the flow for HS-64 ? (Port or Stdb)
   Ans.

5. Why was hanger H-17 revised ?
   Ans.

6. In the valve list, HS-64 has a + symbol to the left, why ?
   Ans.

7. To what block valve is FL-2 attached ?
   Ans.

8. What is the pipe length required for P-2877 ?
   Ans.

9. What pipe or pipes are supported by hanger H-18 ?
   Ans.

10. In what direction is the flow of HS-38 ? (Up or Down)
    Ans.

11. HS-37 has two lines connected to the top, what are the pipe numbers ?
    Ans.

12. How far off the baseline is the bottom of HS-36 located ?
Ans.

13. In section view 14A what is the distance between centers of pipes P2539U-½" and P2538T-½" ?
Ans.

14. What type of material is used for HS-35 ?
Ans.

15. How many F-4 fittings are used on this drawing and to what pipes are thet attached ?
Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number 9

Materials: Drawing 2300-547x1

1. Is valve HS-33 when installed, locked open or shut ?

   Ans. LOCKED SHUT

2. Does P2538T-½" service HS-41 or HS-42 ?

   Ans. HS-42

3. F-6 is a reducing tee, what pipe or pipes does it service ?

   Ans. P2598-3/8", P2832-½", and HS-33

4. In what direction is the flow for HS-64 ? (Port or Stdb)

   Ans. PORT

5. Why was hanger H-17 revised ?

   Ans. TO CLEAR ADJACENT HANGER

6. In the valve list, HS-64 has a + symbol to the left, why ?

   Ans. TO SPECIFY ITEM IS N.D.

7. To what block valve is FL-2 attached ?

   Ans. HS-35

8. What is the pipe length required for P-2877 ?

   Ans. 15' (Fifteen Feet)

9. What pipe or pipes are supported by hanger H-18 ?

   Ans. P2538R-½", P2539W-½"

10. In what direction is the flow of HS-38 ? (Up or Down)

    Ans. UP

11. HS-37 has two lines connected to the top, what are the pipe numbers ?

    Ans. P2540-¼", P2542-¼"

12. How far off the baseline is the bottom of HS-36 located ?
Ans. 21' 4"

13. In section view 14A what is the distance between centers of pipes P2539U-½" and P2538T-½" ?
Ans. 11/16"

14. What type of material is used for HS-35 ?
Ans. Aluminum Alloy

15. How many F-4 fittings are used on this drawing and to what pipes are thet attached ?
Ans. 2, P2544 and P2546

# TRIDENT STANDARD CROSS REFERENCING SYSTEM

## PURPOSE:

THE PRIMARY OBJECTIVE OF THIS HANDOUT IS TO FAMILIARIZE YOU WITH BLUEPRINT (CROSS-REFERENCE) SYSTEM OF STANDARD DRAWINGS ESTABLISHED FOR THE VERIFICATION OF MATERIALS NEEDED TO FABRICATE AND INSTALL A HANGER ASSEMBLY. THIS SAME SYSTEM IS ALSO UTILIZED TO VERIFY THE MATERIALS OF A PRE-FABRICATED ASSEMBLY.

OBTAIN THE NECESSARY PLANS FROM THE PLAN FILE. BE CERTAIN THEY ARE THE LATEST REVISIONS.

FOR MATERIAL VERIFICATION YOU WILL NEED THE HANGER PRINT AND A COMPLETE SET OF TRIDENT HANGER STANDARD DRAWINGS (SEE THE LIST OF PLAN NUMBERS ON THE HANDOUT COVERSHEET).

## TRIDENT HANGER DETAIL

87524-9071

## TRIDENT HANGER STANDARD DRAWINGS:

2620-286-10
2620-286-11
2620-286-12
2620-286-13
2620-286-14

## STEP I

A. STARTING WITH THE HANGER DETAIL PLAN. 87524-9071

NOTE PLAN NUMBER IS FOUND IN THE TITLE BLOCK.

B. GO TO THE INDEX AND LOCATE THE HANGER IN QUESTION, AND THE SHEET NUMBER.

C. PROCEED TO SHEET NUMBER LISTED.

NOTE ALWAYS LOOK IN THE INDEX. HANGERS ARE NOT ALWAYS LISTED IN ORDER.

NOTE THE INDEX IS A GOOD TIME SAVER.

Index

| CONTENTS | SH NO | CONTD ON SH NO | REVISIONS K |
|---|---|---|---|
| TITLE | 001 | | K |
| REVISION | 002 | | K |
| INDEX | 003 | | K |
| REFERENCES | 004 | | K |
| GEN NOTES | 005 | | K |
| GEN NOTES | 006 | | K |
| INST NOTES | 007 | | K |
| INST NOTES | 008 | | K |
| NH 1 | 009 | | K |
| NH 2 | 010 | | K |
| NH 3 | 011 | | K |
| NH 4 | 012 | | K |
| NH 5 | 013 | | K |
| NH 6 | 014 | | L |
| NH 7 | 015 | | L |
| NH 8 | 016 | | L |
| NH 9 | 017 | | L |
| NH 10 | 018 | | L |
| NH 11 | 019 | | L |
| NH 12 | 020 | | L |
| NH 13 | 021 | | K |
| NH 14 | 022 | | K |
| NH 15 | 023 | | K |
| NH 16 | 024 | | K |
| NH 17 | 025 | | K |
| NH 18 | 026 | | K |
| NH 19 | 027 | | K |
| NH 20 | 028 | | K |
| NH 21 | 029 | | K |
| NH 22 | 030 | | K |

CONTRACT NO0024-73-C-0232
GENERAL DYNAMICS
Electric Boat Division
87524-9071
DR EL CHK
ENGR NRP
TECH
APPD
DATE
CATEGORY F
APPD AS TYPE 1 DRAWING
NAVY APPROVAL NOT REQUIRED
APPVL CAT 3

DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
WASHINGTON D.C. 20362

SSBN TRIDENT CLASS
HANGERS
MSL GAS N2 BANK NO. 2

HGRS MSL GAS N2 BANK NO 2

| SIZE | FSCM NO | | NAVSEA DRAWING NO | REV |
|---|---|---|---|---|
| B | 80064 | 704 | 4644891 | K |

SCALE NONE SHEET 001 OF 035

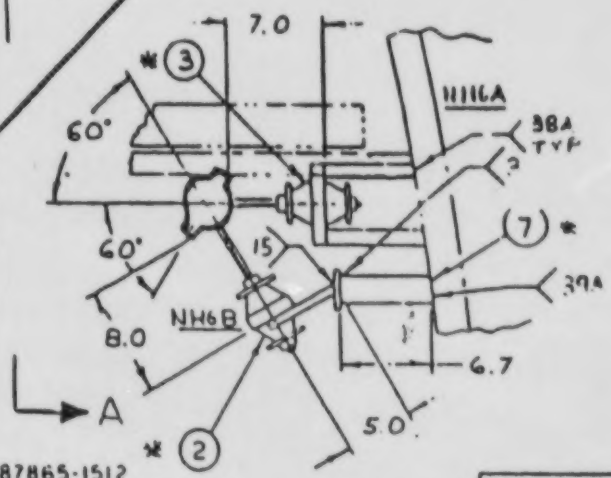
THE DETAIL DRAWING ALSO DESIGNATES THE ITEMS REQUIRED TO MAKE UP A COMPLETE ASSEMBLY. THESE ITEMS ARE DEPICTED AS ENCIRCLED NUMBERS. ①, ②, ③, ① & ⑬ ARE THE ITEM NUMBERS ASSOCIATED WITH THIS HANGER ASSEMBLY.

PARTS LIST

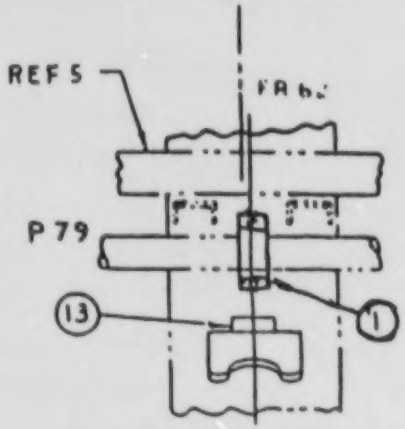
| ITEM NO SEQ NO | QTY CLASS | U/M LVL | NOUN NAME SIZE OR WEIGHT | TYPE | MODIFIER MATERIAL | DOCUMENT OR DRAWING NO | C/I U/M | PART NUMBER OR NATL STK NO | SERVICE OR REMARKS | F R | S M |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 80066 | 1 | PC M | HANGER ASSY | PIPE | N/A | 87624-9071 NH6 | 96169 | 4644891-0000NH6 NF | | | X |
| IT ① 80068A | 1 | PC M | HANGER ASSY 2.000IPS | PIPE | CLAMP TY STL | 2620-286-14 ASSY AG | 96169 | 2445498-00A0 | | | X |
| IT 2 80068B | 1 | PC M | HANGER ASSY 100 LBS | PIPE | MOUNT & SPRT N/A | 2620-286-11 ASSY BCH | 96169 | 2445496-008DN NF | WL | | X |
| IT 3 80068C | 1 | PC M | HANGER ASSY 100 LBS | PIPE | MOUNT LUG SPRT N.A | 2620-286-11 ASSY EDH | 96169 | 2445496-00EDN NF | WL | | X |
| IT 7 80066F | 1 | FT M | TUBE 2.000 x 2.000 x 0.187NOM | SQUARE | STL | ASTM-A500 GRADE B | 96169 | 40-03-1668 NF | | | X |
| IT 13 80069 | 8 | IN M | BAR 0.500 x 3.000 | FL | HR STL | 00-S-741 | 96169 | 30-11-0830 NF | | | X |

NOTES

1. Remember your theory.
2. Item ① consists of clamp halves, liner and fasteners.
3. Plan No. and Assy found in drawing column of the list of material.
4. Proceed to proper Plan and Assy.




SECTION LOOKING AFT

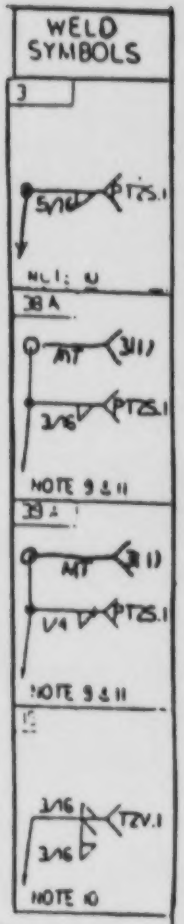



ELEVATION A-A LOOKING TO PORT

FWD

NH6A PORT
NH6B

WELD SYMBOLS




NOTE 21
HGR REF LOCATION: PANEL 8F ON 87865-1512

| HGR. NO. | COLD LOAD | DEFLECTION |
|---|---|---|
| NH6A | —— | —— TNSN |
| NH6B | —— | —— CPRSN |

Contract No N00024-73 C-0232
GENERAL DYNAMICS
Electric Boat Division
87524-9071

HGRS MSL GAS N2 BANK NO 2

| SIZE | FSCM NO | DRAWING NO | | REV |
|---|---|---|---|---|
| B | 80064 | 704 | 4644891 | K |

SCALE 1/8 SHEET 014

GENERAL DYNAMICS
2620-286-14

NAVAL SHIP SYSTEMS COMMAND

HANGER STANDARD
CLAMPS & BLOCKS
ASSY & DET

| | | | |
|---|---|---|---|
| H | 80064 | 845 | 2445498 |

NAVY APPROVAL NOT REQUIRED

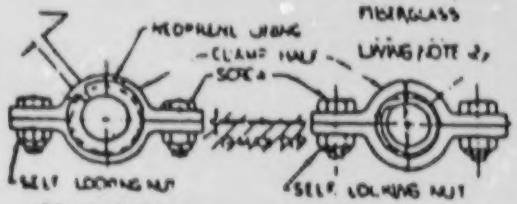



TABLE 2A CLAMP ASSEMBLIES

PLAIN (FOR HOT SYSTEM)

| NOM IPS SIZE | | 1/4 | 3/8 | 1/2 | 3/4 | 1 | 1 1/4 | 1 1/2 | 2 | 2 1/2 | 3 | 3 1/2 | 4 | 5 | 6 | 8 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASSY | | A | B | C | D | E | F | G | H | J | K | L | M | N | P | R | |
| CLAMP HALF | ITEM | | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| | QTY | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| NEOPRENE LINING | ITEM | | | | | | | | | | | | | | | | |
| | QTY | 1 | | | 1 | | 1 | 1 | 1 | | | | 1 | 1 | 1 | 1 | 1 |
| SCREW | ITEM | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 20 | 21 | 22 | 24 | 25 | 26 | | |
| | QTY | 2 | 2 | 2 | | | | | | 2 | 2 | 2 | | 2 | 2 | 2 | 2 |
| SELF LKG NUT | ITEM | 279 | 279 | 279 | 279 | 279 | 279 | 279 | 279 | 280 | 281 | 282 | 283 | 284 | 285 | 286 | 287 |
| | QTY | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| WASHER | ITEM | | | | | | | | | | | | | | | | |
| | QTY | | | | | | | | | | | | | | | | |

PLAIN (FOR COLD SYSTEM)

| NOM IPS SIZE | | 1/4 | 3/8 | 1/2 | 3/4 | 1 | 1 1/4 | 1 1/2 | 2 | 2 1/2 | 3 | 3 1/2 | 4 | 5 | 6 | 8 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASSY | | AA | AB | AC | AD | AE | AF | AG | AH | AJ | AK | AL | AM | AN | AP | AR | |
| CLAMP HALF | ITEM | | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| | QTY | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| NEOPRENE LINING | ITEM | 147 | 148 | 149 | 150 | 151 | 152 | 153 | 154 | 155 | 156 | 157 | 158 | 159 | 160 | 161 | 162 |
| | QTY | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| SCREW | ITEM | 42 | 43 | 42 | 43 | 42 | 43 | 42 | 43 | 20 | 21 | 22 | 24 | 25 | 26 | | |
| | QTY | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| SELF LKG NUT | ITEM | 327 | 328 | 328 | 328 | 328 | 328 | 328 | 328 | 328 | 328 | 328 | 328 | 328 | 328 | 328 | 328 |
| | QTY | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| WASHER | ITEM | | | | | | | | | | | | | | | | |
| | QTY | | | | | | | | | | | | | | | | |

65

NOTES

1. Plan 2620-286-14, look up assembly AG
2. Find item numbers for hanger (Clamps) (Liner) (Screw) (Nut)
3. Description of item number will be found on Plan 2620-286-13

NOTE: Reference to list of material for item numbers is found in the reference block of the plan in which the item numbers were located.

| REF # | DRAWING NUMBER | DESCRIPTION OF PLAN |
|---|---|---|
| | | |
| 1 | 2620-286-13 | HANGER STANDARD MATERIAL LIST |

GENERAL DYNAMICS
2620-286-13

NAVAL SHIP SYSTEMS COMMAND

HANGER STANDARD
CLAMPS & BLOCKS
MATERIAL

| | | | | |
|---|---|---|---|---|
| H | 80064 | 845 | 2445497 | H |

NAVY APPROVAL NOT REQUIRED

ITEM-NO

| ITEM # | noun size or weight | TYPE | modifier material |
|---|---|---|---|
| 7 | BAR 0.250 X 2.000 | FLAT | HR STL |
| 152 | CHANNEL 2.250 W 2.000 | CH 0.375 H | EXTD NPRN |
| 328 | NUT 0.375 - 16UNC - 3B | SLFLKG | HEX-GALV STL |

66

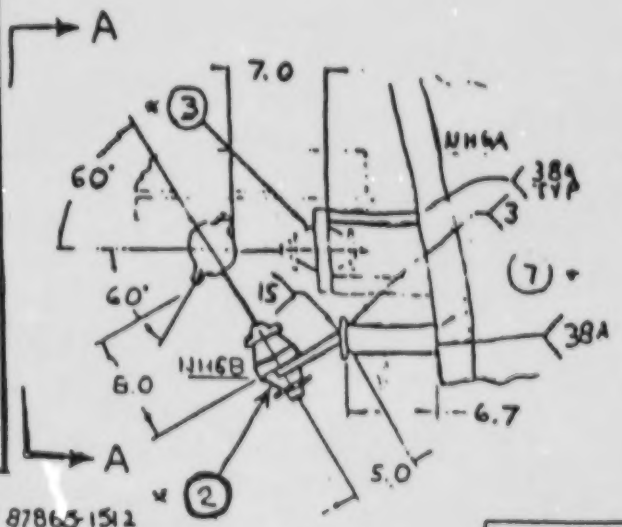
## PARTS LIST

| ITEM NO / SEQ NO | QTY / CLASS | U/M / U/C | NOUN NAME / SIZE & DESCRIPTION | TYPE | MODIFIER / CRITERIA | DOCUMENT OR DRAWING NO | CAGE | PART NUMBER OR IDENTIFYING NO | SERVICE OR REMARKS | F/M |
|---|---|---|---|---|---|---|---|---|---|---|
| 6 SVNS | | PC N | HANGER ASSY | PIPE | | 87524-9071 NHA | 96169 | 46448[illegible]-0000NHB | | |
| IT 1 6036A | | PC N | HANGER ASSY 2.000IPS | PIPE | CLAMP TY STL | 2620-286-11 ASSY BG | 96169 | 2446498-00AD | | |
| IT 2 | 1 | PC N | HANGER ASSY 100 LBS | PIPE | MOUNT & SPRT N/A | 2620-286-11 ASSY BDN | 96169 | 2446496-00BDN | NC | |
| IT 5 6006C | | PC N | HANGER ASSY 20 LBS | PIPE | MOUNT LUG SPRT N/A | 2620-285-11 ASSY BDN | 96169 | 2445495-00EDN | NC | |
| IT 7 6006F | | PC N | [illegible] 2.000 x [illegible] x 0.187NOM | | SHIM PL | MSTR PL [illegible] | [illegible] | [illegible]-1868 | | |
| IT 13 6008D | 9 | MT N | BAR 2.500 x 3.0C. | FL | NR STL | 00-5-[illegible] | 96169 | 30-11-0830 | | |

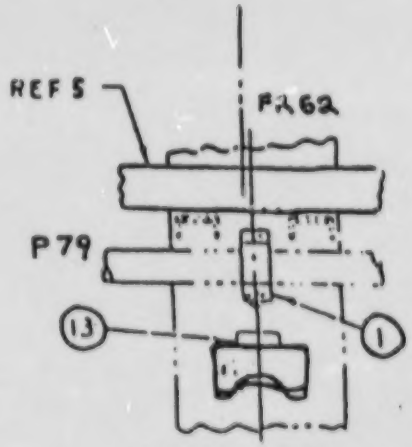
### NOTES

1. REMEMBER YOUR THEORY.
2. ITEM 2 (MOUNT & SPRT)
3. ITEM 2 CONSISTS OF (ROD) (MOUNT) (HEX NUTS) (SLKG NUT) (SPRT NUT) (SPRT BOLT & (SUPPORT)
4. PROCEED TO PROPER PLAN & ASSY.

PLAN 2620-286-11, ASSY BDN




SECTION LOOKING AFT



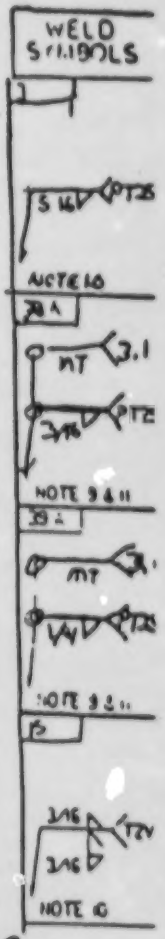

ELEVATION A-A LOOKING TO PORT

FWD

NH6A NH6B PORT

NOTE 21
HIGH REF LOCATION PANEL BF ON 87863-1512

| HGR NO. | COLD LOAD | DEFLECTION |
|---|---|---|
| NH6A | - | TNSN |
| NH6B | | CPRSN |




| CONTRACT NO. | CAGE NO. | DRAWING NO. | REV |
|---|---|---|---|
| GENERAL DYNAMICS Electric Boat Division | 87524 9071 | | |

| SIZE | FSCM NO. | DRAWING NO | REV |
|---|---|---|---|
| B | 80064 | 704 | 4644841 |

SCALE 1/8 SHEET 2 OF 6

GENERAL DYNAMICS

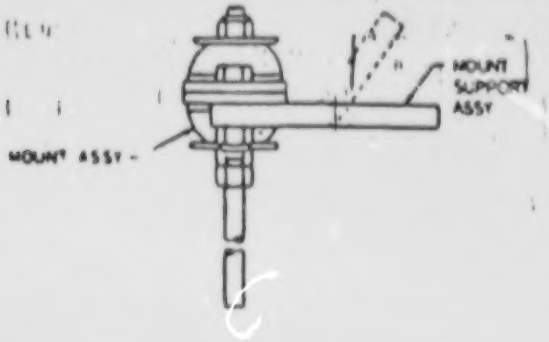
NAVAL SHIP SYSTEMS COMMAND

2620-286-11

NOTES:

HANGER STANDARD MOUNTS WITH SUPPORT ASSEMBLIES

1. FIND ASSY BDN FOR MTS AND SPRT ASSY ON PLAN 2620-286-11
2. TABLE 16, 17, & 18 FIND ASSY SAN.
3. TABLE 16 LOOK UP ITEM NUMBERS FOR ASSY SAN.
4. START WITH ROD TABLE, GO TO NEXT PAGE



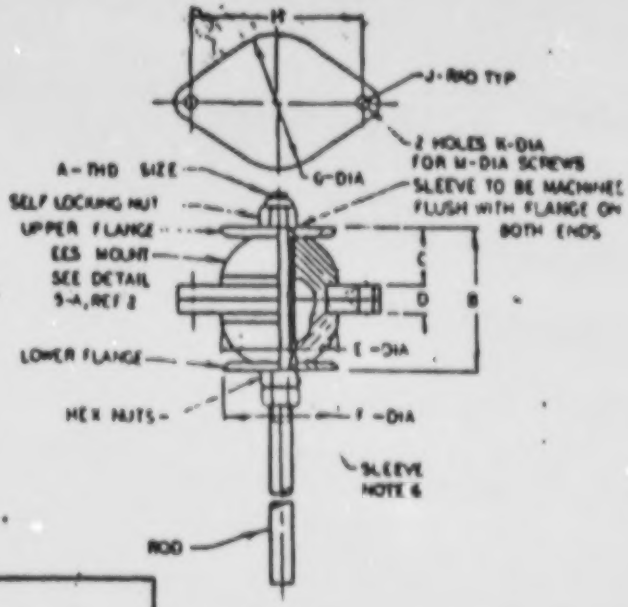




TABLE 2 MOUNT & SUPPORT ASSY.

| USE ABOVE BILGE LINE | | | | USE BELOW BILGE LINE | | |
|---|---|---|---|---|---|---|
| ASSY | MOUNT SIZE | MOUNT ASSY TABLE 15,17A,19 | SPRT ASSY TABLE 36 REF 2 | ASSY | MOUNT ASSY TABLE 18,17A,19 | SPRT ASSY TABLE 36 REF 2 |
| BA | 35° | SA | UE | BAN | VWB | UR |
| BB | 45° | VC | UC | BBN | VWC | UH |
| BC | 60° | SE | UG | BCN | VWE | UK |
| BD | 300° | SC | UL | BDN | SB | UM |
| BE | 150° | SF | UN | BEN | SD | UP |
| BF | 350° | SG | UR | BFN | SC | US |
| BG | 450° | TA | UT | BGN | TB | UU |
| BH | 900° | TC | UV | BHN | TD | UW |
| BJ | 5° | VAA | | BJN | VFA | UJ |
| BK | 25° | VCN | UE | BKN | VDN | UH |
| BL | 35° | VEN | UG | BPN | VFN | UK |
| BDW | 100° | SAN | UL | BRN | SBN | UM |
| BCQ | 150° | SCN | UN | BSN | SDN | UP |
| BCC | 150° | ECN | UR | BTN | SCN | US |

TABLE 16 EES MOUNTS

| ASSY | EES MOUNT | | | ADD TABLE 27 REF 2 | | SLEEVE DET B-A REF 2 | | SELF LKGNUT | | HEX NUT | | TAB LOCK WASHER | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SIZE | ITEM | QTY | ITEM | QTY | ITEM | QTY | ITEM | QTY | ITEM | QTY | ITEM | QTY |
| SA* | 100 | K | 2 | 18 | 1 | 139 | 1 | 293 | 1 | 187 | 2 | | |
| SB | 100 | K | 3 | 26 | 1 | 139 | 1 | 211 | 1 | 197 | 2 | | |
| SC | 150 | S | 2 | 18 | 1 | 140 | 1 | 293 | 1 | 187 | 2 | | |
| SD | 150 | S | 2 | 26 | 1 | 140 | 1 | 211 | 1 | 197 | 2 | | |
| SAN | 100 | K | 2 | 18 | 1 | 139 | 1 | 293 | 1 | 187 | 2 | | |
| SBN | 100 | K | 3 | 26 | 1 | 139 | 1 | 211 | 1 | 197 | 2 | | |
| SCN | 150 | S | 2 | 18 | 1 | 140 | 1 | 293 | 1 | 187 | 2 | | |
| SDN | 150 | S | 2 | 26 | 1 | 140 | 1 | 211 | 1 | 197 | 2 | | |

DIMENSIONS FOR LAYOUT PURPOSES ONLY

| SIZE | A | B | C | D | E | F | G | H | J | K | M |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 100* | 5/8-11UNC-2A | 4.06 | 1.59 | .88 | 3.00 | 3.00 | 3.38 | 4.75 | .56 | 3 3/64 | 1/2 |
| 150* | 5/8-11UNC-2A | 4.14 | 1.57 | 1.00 | 3.25 | 3.25 | 3.50 | 5.38 | .62 | 4 1/64 | 5/8 |

| NOTES |
|---|
| 1. ITEM'S ASSY SAN 18 293 187 TABLE 16 |
| 2. ITEM 18 SAY'S ROD TABLE 27 REF 2 ITEM 18 |
| 3. TO FIND REF 2 LOOK IN REF BLOCK OF THE PLAN IN WHICH YOUR ITEM NUMBER'S WERE FOUND |
| NOTE: ALL DIMENSION'S ARE LETTERED ABOVE TABLE 27 |
| EXAMPLE: A-DIA is 5/8 |
| NOTE: ALWAYS REMEMBER TO LOOK IN REF BLOCK BEFORE GOING TO ANOTHER PLAN. |

| REF# | DRAWING NUMBER | DESCRIPTION OF PLAN |
|---|---|---|
| 2 | 2620-286-12 | HANGER STANDARD MTS & SPRT |
| 1 | 2620-286-10 | HANGER STANDARD MATL LIST |

GENERAL DYNAMICS
Electric Boat Division

NAVAL SHIP SYSTEMS COMMAND

2620-286-11

HANGER STANDARD
MOUNTS WITH SUPPORT
ASSEMBLIES

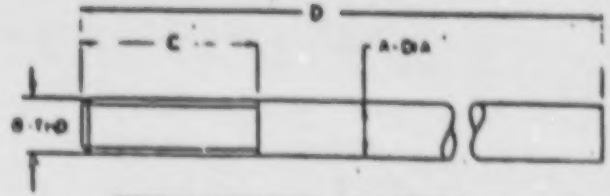



TABLE 27 MOUNT ROD

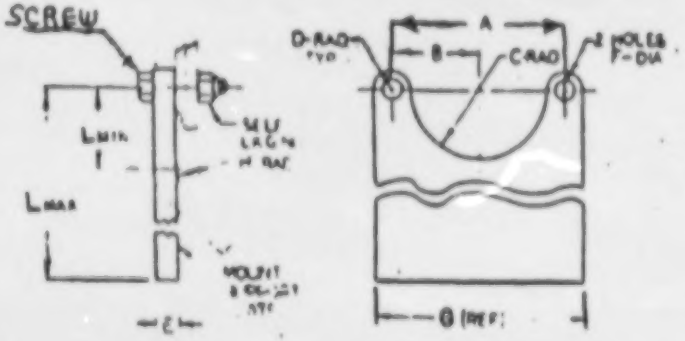
| TYPE MOUNT | SIZE | ITEM | A | B | C | D |
|---|---|---|---|---|---|---|
| MI | 15° | 16 | 1/4 | 1/4-20UNC-2A | 3.19 | 18.00 |
| | 15° | 21 | | | | |
| | 25° | 13 | 3/8 | 3/8-16UNC-2A | 4.25 | 18.00 |
| | 50° | 23 | | | | |
| EES | 100° | 17 | 3/8 | 3/8-11UNC-2A | 7.00 | 18.00 |
| | 150° | | | | | |
| | 100° | 18 | 5/8 | 3/8-11UNC-2A | 8.75 | 24.00 |
| | 150° | 26 | | | | |
| | 450° | 19 | 3/4 | 3/4-10UNC-2A | 9.75 | 24.00 |
| | | 27 | | | | |
| | 900° | 20 | 1 | 1-8UNC-2A | 12.25 | 30.00 |
| | | 28 | | | | |
| | 2000 | 213 | 1 1/2 | 1 1/2-6UNC-2A | 20.00 | 36.00 |
| | | 283 | | | | |
| SPOOL | 15° | 12 | 3/16 | 3/16-18UNC-2A | 3.00 | 18.00 |
| | | 22 | | | | |
| | 50° | 13 | 3/8 | 3/8-16UNC-2A | 4.25 | 18.00 |
| | | 23 | | | | |
| | 100° | 14 | 1/2 | 1/2-13UNC-2A | 5.00 | 18.00 |
| | | 24 | | | | |
| | 2 0° | 15 | 5/8 | 5/8-11UNC-2A | 5.50 | 18.00 |
| | | 25 | | | | |
| MI | | | | | | |
| EES | 900° | 291 | | | | |
| EES MI | 2000 | 292 | 1 1/2 | 1 1/2-6UNC-2A | 20.00 | 36.00 |
| | | 283 | | | | |

## NOTES

1. Sheet No. 6 look for assy for sprt plate
2. Assy UL Table 36 Ref 2
3. Ref 2 is standard 2620-286-12
4. All information under assy UL
5. All dimensions are lettered above table
6. Example: A = 4.75 under assy UL
7. Go to proper list of material for item numbers

## REFERENCE DRAWING'S

| REF# | DRAWING NUMBER | DESCRIPTION OF PLAN |
|---|---|---|
| 2 | 2620-286-11 | HANGER STANDARD MTS & SPRT |
| 1 | 2620-286-10 | HANGER STANDARD MATL LIST |




GENERAL DYNAMICS
Electric Boat Division

DEPARTMENT OF THE NAVY
NAVAL SHIP SYSTEMS COMMAND

2620-286-10

HANGER STANDARD
MOUNTS WITH SUPPORT
MATERIAL

NAVY APPROVAL
NOT REQUIRED

| SIZE | CAGE IDENT NO | DRAWING NO | REV |
|---|---|---|---|
| H | 80064 | 845 2445494 | P |

## TABLE 36 MI & EES MOUNT SUPPORT ASSY

| ASSY | | UE | UF | UG | UH | UJ | UK | UL | UM | UN | UP | UR | US | UT | UU | UV | UW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SIZE | | 15 | 15 | 25 | 25 | 50 | 50 | 00 | 00 | 50 | 150 | 250 | 250 | 450 | 450 | 167 | 167 |
| SCREW | ITEM | 43 | 244 | M7 | 25 | 60 | 260 | M6 | 157 | 219 | 146 | 221 | 46 | 22 | 140 | 222 | 162 | 224 |
| | QTY | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| SELF LKG NUT | ITEM | 179 | 207 | 29 | 208 | 291 | 209 | 292 | 210 | 293 | 211 | 295 | 211 | 293 | 211 | 294 | 212 |
| | QTY | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| MOUNT SPRT PLATE | ITEM | 74 | | 75 | | 76 | | 77 | | 78 | | 79 | | 80 | | 81 | |
| | QTY | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | |
| DIMENSIONS FOR MOUNT SUPPORT | A | 2.00 | | 3.50 | | 3.50 | | 4.75 | | 5.38 | | 5.38 | | 5.38 | | 8.25 | |
| | B | 1.00 | | 1.93 | | 1.75 | | 2.38 | | 2.69 | | 2.69 | | 2.69 | | 4.12 | |
| | C | .78 | | 1.19 | | 1.19 | | 1.56 | | 1.81 | | 1.81 | | 1.81 | | 3.31 | |
| | D | .22 | | .56 | | .56 | | .81 | | .88 | | .88 | | .88 | | .81 | |
| | E | 1/4 | | 1/2 | | 1/2 | | 5/8 | | 5/8 | | 3/4 | | 1 | | 1 | |
| | F | 19/64 | | 27/64 | | 27/64 | | 35/64 | | 11/16 | | 11/16 | | .16 | | .16 | |
| | G | 2.44 | | 4.62 | | 4.62 | | 6.38 | | 7.14 | | 7.14 | | 7.14 | | 9.88 | |
| | H | .25 | | .50 | | .50 | | .62 | | .62 | | .75 | | 1.00 | | 1.00 | |
| | L MAX | 1.25 | | 10.50 | | 7.50 | | 8.00 | | 6.00 | | 8.75 | | 5.25 | | 4.50 | |
| | L MIN | .00 | | 1.45 | | 1.45 | | 2.00 | | 2.10 | | 2.10 | | 2.50 | | 0.00 | |

## LIST OF MATERIAL

### PARTS OF MOUNTS

| ITEM | QTY ASSY | U/M | NOMENCLATURE TYPE | DOCUMENT NO DRAWING NO | FSC | PART NUMBER |
|---|---|---|---|---|---|---|
| 187 | 8 | PC NA | NUT 0.625-11UNC-2B | | 5310 | 60-00-4[illegible] |
| 293 | 8 | PC NA | NUT 0.625-11UNC-3B SLFLKG HEX GALV STL | MS-17829 MIL-N-25027 QQ-Z-325 TY 2 CL 2 CR 2 | 96460 | 60-00-2264 |
| 18 | 8 | PC NA | BAR 0.625 RD HR STL | QQ-S-[illegible] | 96189 | 37-01-[illegible] |

### PARTS OF SUPPORT

| | | | | | | |
|---|---|---|---|---|---|---|
| 292 | 8 | PC NA | NUT 0.500 13UNC 3B SLFLKG HEX GALV STL | MS-17828 MIL-N-25027 QQ-Z-325 TY 2 CL 2 CR 2 | 96460 | 60-00-2262 |
| 77 | 8 | PC NA | PLATE 0.625 THK STL | MIL-S-22698 CL 8-11 3 GR A | 96189 | 20-07-0626 |
| 157 | 8 | PC NA | SCREW 0.500-13UNC-2B[illegible].500 CRP HEX HD STL | MIL-S-962 (MOD) TY 2 CH 6 | 96189 | 60-02-0281 |

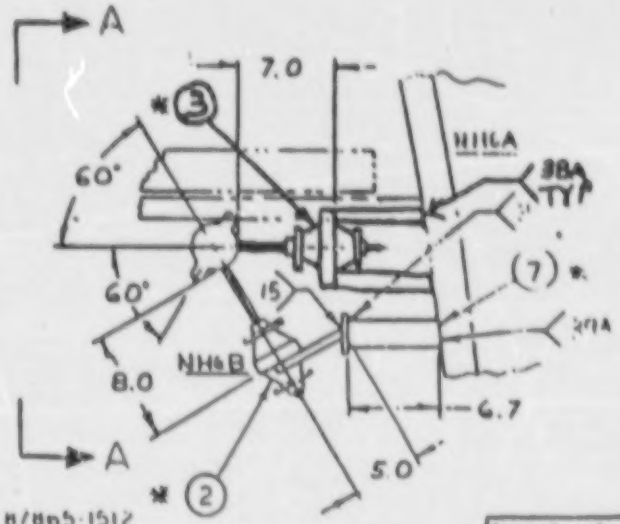
## PARTS LIST

| ITEM NO / SEG | QTY / CLASS | U/M / LVL | NOUN NAME / SIZE OR WEIGHT | TYPE | MODIFIER / MATERIAL | DOCUMENT OR DRAWING NO | C/I / U/M | PART NUMBER / NAT'L STK NO | SERVICE OR REMARKS | P A | B M |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 80068 | 1 | PC N | HANGER ASSY | PIPE | N/A | 07824-5071 NHB | 96169 | 4644891-0000NHB NF | | | X |
| 11 1 80068A | 1 | PC N | HANGER ASSY 2.000IPS | PIPE | CLAMP IT STL | 2620-286-14 ASSY A0 | 96169 | 2445498-00A0 | | | X |
| 11 2 80068 | 1 | PC N | HANGER ASSY 100 LBS | PIPE | MOUNT & SPRT N/A | 2620-286-11 ASSY B0N | 96169 | 2445498-00B0N NF | | | X |
| 11 3 80068 | 1 | PC N | HANGER ASSY 100 LBS | PIPE | MOUNT LUG SPRT N/A | 2620-285-11 ASSY E0N | 96169 | 2445498-00E0N NF | NC | | X |
| 11 5 80068 | 1 | FT N | TUBE 2.000 x 2.000 x 0.187NOM | SQUARE | STL | MSFM-8530 | 96165 | 4[illegible] NF | | | X |
| 11 13 80068 | 9 | IN N | BAR 0.800 x 3.000 | FL | MA STL | GANGE B 80-S-741 | 96169 | 30 11-0830 NF | | | X |

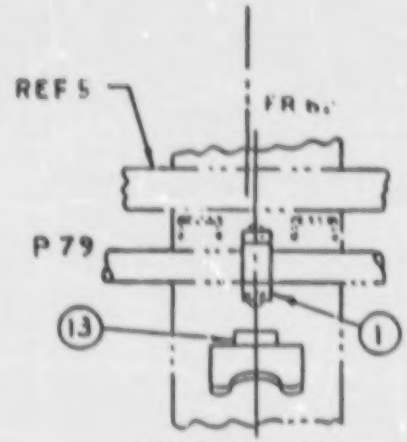
### NOTES

1. Remember your theory
2. Item 3 mount & lug sprt
3. Item 3 consists of (mount) (rod) (slkg nut) (Hex headnuts) (sprt nut) (sprt bolt) and lugs
4. Proceed to proper plan and assy

Plan 286-11 assy EDN




SECTION
LOOKING AFT




ELEVATION A-A
LOOKING TO PORT
FWD

NH6A PORT
NH6B

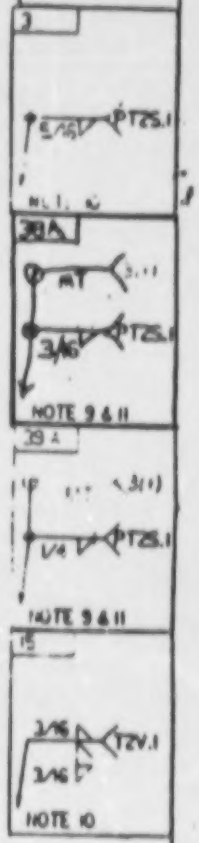
| JR NO | COLD LOAD | DEFLECTION |
|---|---|---|
| NH6A | -- | — TNSN |
| NH6B | -- | — CPRSN |

GENERAL DYNAMICS
Electric Boat Division

| SIZE | FSCM NO | DRAWING NO | REV |
|---|---|---|---|
| B | 80064 | [illegible] | K |

SCALE 1/8 SHEET 0/8

WELD SYMBOLS



## NOTES

1. On assy EDN assy SAN is the same as Item 2 Go on to lug sprt.
2. Lug support Table 30 & 31 Ref 2, assy M, size 3
3. Ref 2 is found in the ref block of the drawing which the items were found.
4. Proceed to proper plan & assy.

   Ref 2 Table 30 & 31 assy M

NOTE: Remember size & type of MT.

## TABLE 5 MOUNT & LUG SUPPORT ASSY

| USE ABOVE BILGE LINE | | | | | | USE BELOW BILGE LINE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ASSY | MOUNT SIZE | MOUNT ASSY TABLE 16, 17 & 19 | LUG SUPPORT TABLE 30 & 31 REF 2 ASSY | SIZE | QTY | ASSY | MOUNT ASSY TABLE 16, 17 & 19 | LUG SUPPORT TABLE 30 & 31 REF 2 ASSY | SIZE | QTY |
| EA | 15° | XA | P2 | 5 | 2 | EM | YB | PK | 2 | 2 |
| EB | 23° | XC | K | 1 | 2 | EN | YD | S | 7 | 2 |
| EC | 30° | XE | L | 2 | 2 | EP | YF | T | 8 | 2 |
| ED | 45° | XG | M | 3 | 2 | ER | YH | U | 9 | 2 |
| EE | 120° | XK | K | K | 2 | ES | YK | K | K | 2 |
| EF | 45° | TA | M | 4 | 2 | ET | TB | V | 10 | 2 |
| EG | 90° | TC | P | 5 | 2 | EU | TD | W | 11 | 2 |
| EH | 2000 | TE | R | 6 | C | EV | TF | Y | 12 | C |
| EW | 2000 | TL | R | 6 | 2 | EY | TM | K | 12 | 2 |
| EJ | 6000 | TH | R | 6 | C | EL | TP | Y | 12 | 2 |
| EK | 3000 | TU | R | 6 | 2 | EZ | TV | Y | 12 | 2 |
| EAM | 15° | VAM | M | 1 | 2 | EMN | VBN | PK | 2 | 2 |
| EBM | 23° | VCM | K | 1 | 2 | ENN | VDN | S | 7 | 2 |
| ECM | 30° | VEM | L | 2 | 2 | EPN | VFN | T | 8 | 2 |
| EDM | 100° | SAM | M | 3 | 2 | ERN | SBN | U | 9 | 2 |
| EAN | 180° | SCN | LN | 4 | 2 | ESN | SDN | V | 10 | 2 |
| — | 1000 | | | | | EAN | YD | 2 | 12 | 2 |
| — | 5000 | | | | | EZN | TV | 2 | 12 | C |
| CHR | 2000 | TEA | R | 6 | 2 | CYR | TFA | 2 | 12 | 2 |
| EWR | 2000 | TLR | R | 6 | 2 | EYR | TGR | 2 | 12 | 2 |

| GENERAL DYNAMICS | DEPARTMENT OF THE NAVY NAVAL SHIP SYSTEMS COMMAND | | | |
|---|---|---|---|---|
| 2620-286-4 | HANGER STANDARD MOUNTS WITH SUPPORT ASSEMBLIES | | | |
| | 80064 | 645 | 24-5495 | L |

| SEE# | DRAWING NUMBER | DESCRIPTION OF PLAN |
|---|---|---|
| 2 | 2620-286-12 | HANGER STANDARD MTS & SPRT |
| 1 | 2620-286-10 | HANGER STANDARD MATL LIST |

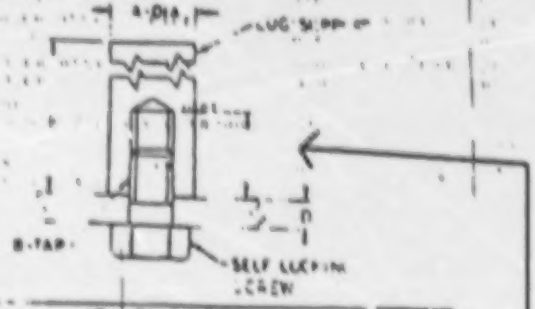



TABLE 30 LUG SUPPORT ASSY

| USE ABOVE BILGE LINE | | | | | USE BELOW BILGE LINE | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ASSY | SIZE | MOUNT SIZE | LUG SPT ITEM | SCREW ITEM | ASSY | SIZE | MOUNT SIZE | LUG SPT ITEM | SCREW ITEM |
| | | 75 MI | 48 | 163 | S | 7 | 89 MI | 14 | 225 |
| | 2 | 80 MI | 49 | 164 | T | 8 | 50 MI | 15 | 226 |
| M | 3 | 100 FEET | 50 | 165 | U | 9 | 100 FEET | | 227 |
| N | 4 | 150 FEET | 51 | 166 | V | 10 | 150 FEET | 51 | 228 |
| P | 5 | 200 FEET | 52 | 167 | W | 11 | 200 FEET | 52 | 229 |
| R | 6 | 200C | 53 | 168 | Z | 12 | 2000 | 53 | 265 |

DIMENSIONS FOR LUG SUPPORTS

| SIZE | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 & 7 | 3/4 | 3/8 - 16UNC - 2B | 1.12 | .38 | 2.00 |
| 2 & 8 | 1 | 1/2 - 13UNC - 2B | 1.00 | .50 | 2.00 |
| 3 & 9 | 1 | 1/2 - 13UNC - 2B | 1.80 | .88 | 20.00 |
| 4 & 10 | 1 1/2 | 5/8 - 11UNC - 2B | 1.50 | 1.00 | .50 |
| 5 & 11 | 1 1/2 | 3/8 - 16UNC - 2B | 2.70 | 1.38 | .50 |
| 6 & 12 | 1 1/2 | 1/2 - 9UNC - 2B | 1.75 | 1.25 | .50 |



NOTES

1. Ref II 2620-286-12
2. Table 30 Assy M, Size 3
3. Dimensions for lugs are below Table 30 by size.
4. Dimensions are lettered and found above the table.

NOTE: Description of each Item No. is found in proper list of material.

GENERAL DYNAMICS
Electric Boat Division

2620-286-10

NAVY APPROVAL NOT REQUIRED

NAVAL SHIP SYSTEMS COMMAND

HANGER STANDARD
MOUNTS WITH SUPPORT
MATERIAL

| | | | |
|---|---|---|---|
| H | 80064 | 845 | 2445494 | P |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 0202 | 0 | PC AR | BAR 1.000 | | 96-B-741 | 98100 | 30-02-7010 | |
| 0203 | 0 | PC AR | BAR 1.000 | | 96-B-741 | 98100 | 30-02-7010 | |
| 0201 | 0 | PC AR | BAR 1.750 | | 96-B-741 | 98100 | 30-02-7020 | |
| 0207 | 0 | PC AR | BAR 1.500 | | 96-B-741 | 98100 | 30-01-7020 | |
| 0203 | 0 | PC AR | SCREW 0.312-18UNC-2A | CAP SLFLKD 1.250 | HEX HD STL | MS-B-657 (MOD) TY 3 GR 5 | 98100 | 60-02-4106 |
| 0204 | 0 | PC AR | SCREW 0.375-16UNC-2A | CAP SLFLKD 1.250 | HEX HD STL | MS-B-657 (MOD) TY 3 GR 5 | 98100 | 60-02-2122 |
| 0205 | 0 | PC AR | SCREW 0.500-13UNC-2A | CAP SLFLKD 1.500 | HEX HD STL | MS-B-657 (MOD) TY 3 GR 5 | 98100 | 60-02-2155 |
| 0206 | 0 | PC AR | SCREW 0.625-11UNC-2A | CAP SLFLKD 2.000 | HEX HD STL | MS-B-657 (MOD) TY 3 GR 5 | 98100 | 60-02-2212 |
| 0207 | 0 | PC AR | SCREW 0.750-10UNC-2A | CAP SLFLKD 2.500 | HEX HD STL | MS-B-657 (MOD) TY 3 GR 5 | 98100 | 60-02-2240 |

## PARTS LIST

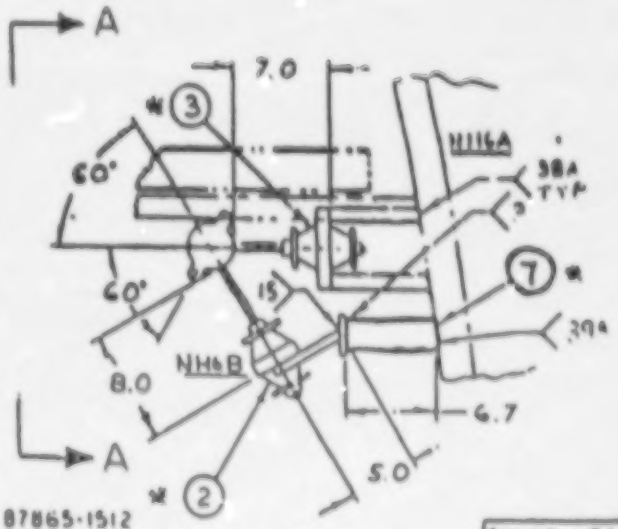
| ITEM NO / SEQ NO | QTY / CLASS | U/M / LVL | NOUN NAME / SIZE OR WEIGHT | TYPE | MODIFIER / MATERIAL | DOCUMENT OR DRAWING NO | C/I / U/M | PART NUMBER / NF NATL STK NO | SERVICE OR REMARKS | P R | B M K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6006 | 1 | PC M | HANGER ASSY | PIPE | N/A | 87524-5071 NHG | 96169 | 4644891-0000NHG NF | | | K |
| 11 1 6006A | 1 | PC M | HANGER ASSY 2.000 IPS | PIPE | CLAMP IY STL | 2620-206-14 ASSY AD | 96169 | 2445496-00AD NF | | | K |
| 11 2 6006B | 1 | PC M | HANGER ASSY 100 LBS | PIPE | MOUNT & SPRT N/A | 2620-206-11 ASSY BOH | 96169 | 2445496-00BOH NF | [illegible] | | K |
| 11 3 6006C | 1 | PC M | HANGER ASSY 100 LBS | PIPE | MOUNT LUG SPRT N.A | 2620-206-11 ASSY COH | 96169 | 2445496-00COH NF | [illegible] | | K |
| 11 7 6006F | 1 | FT M | TUBE 2.000 X 2.000 X 0.187NOM | SQUARE | STL | ASTM-A500 GRADE B | 96169 | 40-03-1668 NF | | | K |
| 11 13 6006G | 8 | IN M | BAR 0.600 X 3.000 | FL | NR STL | 00-S-741 | 96169 | 30-11-0830 NF | | | K |

### NOTES

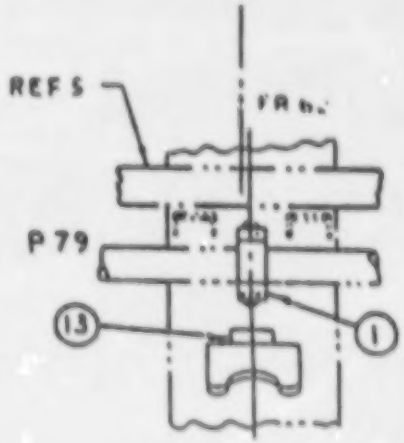
1. Item No. (7) in parts list gives all the information needed.

NOTE:

If any further information was needed the plan would supply a Ref drawing in the drawing number column.




SECTION
LOOKING AFT



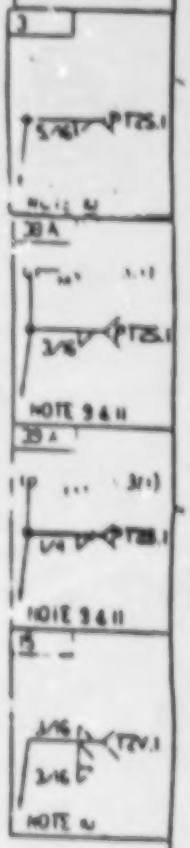

ELEVATION A-A
LOOKING TO PORT
FWD

NH6A PORT
NH6B

NOTE 21
HIGH REF LOCATION: PANEL BF ON 87865-1512

| HGR. NO. | COLD LOAD | DEFLECTION |
|---|---|---|
| NH6A | ——— | —— TNSN |
| NH6B | ——— | —— CPRSN |

WELD SYMBOLS




Contract No N00024-73-C-0232
GENERAL DYNAMICS
Electric Boat Division
87524-9071

| SIZE | FSCM NO | DRAWING NO | REV |
|---|---|---|---|
| B | 80064 | 704 4644891 | K |

SCALE 1/8 SHEET 014

## PARTS LIST

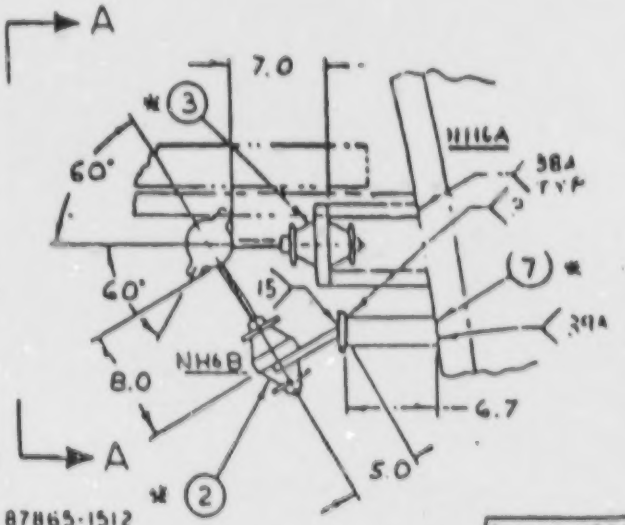
| ITEM NO / SEQ NO | QTY / CLASS | U/M / LVL | NOUN NAME / SIZE OR WEIGHT | TYPE | MODIFIER / MATERIAL | DOCUMENT OR DRAWING NO | C/I / U/M | PART NUMBER / NF NATL STK NO | SERVICE OR REMARKS | P R | S M |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 60064 | 1 | PC M | HANGER ASSY | PIPE | N/A | 87624-9071 NHS | 96169 | 4644891-0000NHS NF | | | X |
| 11 1 60068A | 1 | PC M | HANGER ASSY 2.000IPS | PIPE | CLAMP FT STL | 2620-286-14 ASSY AD | 96169 | 2445498-00A0 | | | X |
| 11 2 60068 | 1 | PC M | HANGER ASSY 100 LBS | PIPE | MOUNT & SPRT N/A | 2620-286-11 ASSY BCH | 96169 | 2445496-008DH NF | [illegible] | | X |
| 11 3 60068C | 1 | PC M | HANGER ASSY 100 LBS | PIPE | MOUNT LUG SPRT N/A | 2620-286-11 ASSY EDH | 96169 | 2445496-00EDH NF | [illegible] | | X |
| 11 7 60067 | 1 | FT M | TUBE 2.000 x 2.000 x 0.187NOM | SQUARE | STL | ASTM-A500 GRADE B | 96169 | 40-03-1668 NF | | | X |
| 11 13 60060 | 1 | IN M | BAR 0.500 x 3.000 | FL | MR STL | 00-S-741 | 96169 | 30-11-0830 NF | | | X |

### NOTES

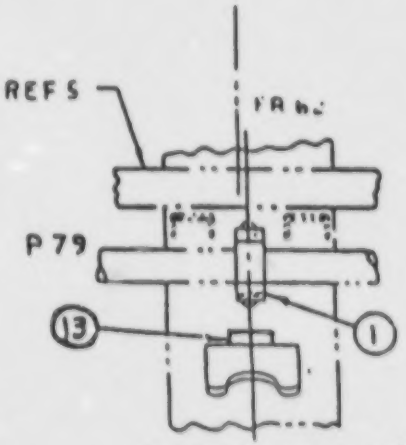
1. Item No. (13) in parts list gives all the information needed.

NOTE:

If any further information was needed the plan would supply a Ref drawing in the drawing number column.




SECTION
LOOKING AFT



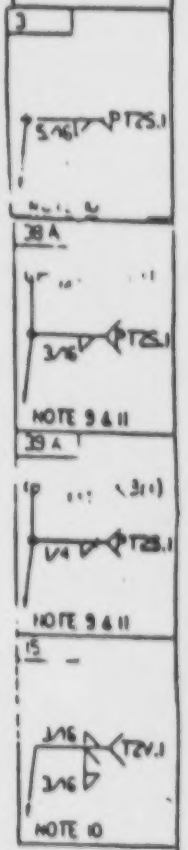

ELEVATION A-A
LOOKING TO PORT
FWD

NH6A
NH6B PORT

NOTE 21
HGR REF LOCATION: PANEL 8F ON 87865-1512

| HGR. NO. | COLD LOAD | DEFLECTION |
|---|---|---|
| NH6A | ——— | —— TNSN |
| NH6B | ——— | —— CPRSN |

WELD SYMBOLS




CONTRACT NO N00024-73-C-0232 NGRS MSL GAS N2 BANK NO 2

GENERAL DYNAMICS
Electric Boat Division

| SIZE | FSCM NO | DRAWING NO | | REV |
|---|---|---|---|---|
| B | 80064 | 704 | 4644891 | K |

87624-9071 SCALE 1/8 SHEET 014

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

HANDOUT: TRIDENT Class Cross-Referencing System
Dwgs. 87524-9071 R/K, 2620-286-10 R/N, 2620-286-11 R/K
2620-286-12 R/M, 2620-286-13 R/H, 2620-286-14 R/G,
Student Material List Answer Sheet

Part One of Three:

Instructions:

Discuss Cross-Referencing System using H/O only.

Part Two of Three:

Instructions:

Issue plans listed on lead sheet of handout. Follow the format shown on handout using standard plans.

Part Three of Three:

Instructions:

Completely identify hanger H-5 using cross-referencing system without the use of the handout. Student Material List Answer Sheet will be used for all answers.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

Dwgs. 87524-4006 R/D, 2620-286-10 R/N, 2620-286-11 R/K,
2620-286-12 R/M, 2620-286-13 R/H, 2620-286-14 R/G
Student Material List Answer Sheet

Question 1

Using cross-referencing system identify all parts of hanger H5-2.
List all answers in order on answer sheet

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

Drawing No. 87524-4006 R/D

Instructions:

Give complete answers to all questions.

1. What does hanger H35-2 support ?
   Ans.

2. What is the pipe no. of the aft pipe that hanger H28-2 supports ?
   Ans.

3. What clearance must be maintained from the hull on the upper support on hanger H32-2 ?
   Ans.

4. What is the angle of the outboard leg of hanger H23-1 ?
   Ans.

5. What is the ship's attachment weld for hanger H6-2 ?
   Ans.

6. What does hanger H26-2 support ?
   Ans.

7. How far from the edge of the frame would you attach the support plate for hanger H33-2 ?
   Ans.

8. How many degrees off the center of the flex should the U-Bolt welded on hanger H27-1 ?
   Ans.

9. When attaching the rod to the clamp on hanger H5-2 what size weld would be required ?
   Ans.

10. What does hanger H23-2 support ?
    Ans.

11. What is the total length of the angle bar used on hanger H42-2 ?
    Ans.

12. At what angle would Pc. 136-2 be cut to attach to Pc. 136-5 on on hanger H35-1 using the elevation view ?
    Ans.

BEST COPY AVAILABLE

B-28 cont.

Lesson Number (cont.)

13. What will hanger H26-2 be attached to onboard ship ?
Ans.

14. What does hanger H37-2 support ?
Ans.

15. What is the distance between the clamp and support plate on hanger H44-2 ?
Ans.

16. How much of a pitch is item 122-2 set off horizontal on hanger H28-2 ?
Ans.

17. When attaching item 121-1 to item 121-2 what size weld would be used ?
Ans.

18. What is the minimum overall dimentions of the block after taking the maximum cut on Pc. 122-2 ?
Ans.

19. How many degrees will the clamps be rolled on hanger H30-2 ?
Ans.

20. When attaching the support plates together on hanger H31-2 what size weld would be required ?
Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

Drawing No. 87524-4006 R/D

Instructions:

Give complete answers to all questions.

1. What does hanger H35-2 support ?
   Ans. F-2 Flex Hose Assy.

2. What is the pipe no. of the aft pipe that hanger H28-2 supports ?
   Ans. P237

3. What clearance must be maintained from the hull on the upper support on hanger H32-2 ?
   Ans. 3.0"

4. What is the angle of the outboard leg of hanger H23-1 ?
   Ans. 35 Degrees

5. What is the ship's attachment weld for hanger H6-2 ?
   Ans. 3/8" fillet weld all-around

6. What does hanger H26-2 support ?
   Ans. P295 & P336

7. How far from the edge of the frame would you attach the support plate for hanger H33-2 ?
   Ans. 0.8"

8. How many degrees off the center of the flex should the U-Bolt rolled on hanger H27-1 ?
   Ans. 5 Degrees

9. When attaching the rod to the clamp on hanger H5-2 what size weld would be required ?
   Ans. 3/16" all-around

10. What does hanger H23-2 support ?
    Ans. P132

11. What is the total length of the angle bar used on hanger H42-2 ?
    Ans. 8.1"

12. At what angle would Pc. 136-2 be cut to attach to Pc. 136-5 on on hanger H35-1 using the elevation view ?
    Ans. 35 Degrees

B-28 cont.

Lesson Number (cont.)

13. What will hanger H26-2 be attached to onboard ship ?
Ans. TRIDENT Subbase

14. What does hanger H37-2 support ?
Ans. P328

15. What is the distance between the clamp and support plate on hanger H44-2 ?
Ans. 10.0"

16. How much of a pitch is item 122-2 set off horizontal on hanger H28-2 ?
Ans. 3 Degrees off horizontal

17. When attaching item 121-1 to item 121-2 what size weld would be used ?
Ans. None (Items are bolted)

18. What is the minimum overall dimentions of the block after taking the maximum cut on Pc. 122-2 ?
Ans. 18.3L X 1.00thk x 3.87W

19. How many degrees will the clamps be rolled on hanger H30-2 ?
Ans. 55 Degrees

20. When attaching the support plates together on hanger H31-2 what size weld would be required ?
Ans. ¼" weld

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required: 87742-1702 R/G

Instructions: Give Three Point Locations For The Following Hangers

1. H1-2
2. H4-2
3. H11-2
4. H10-2 (no height dimention)
5. H3-2
6. H2-2
7. H12-2
8. H6-2
9. H7-2
10. H9-2 (no height dimention)
11. H5-2
12. H8-2
13. How far about the main axis is SSTG Set No. 1 ?
14. How far apart are hangers H4-2 and H10-2 ? (fwd & aft)
    Ans.
15. What is the distance between hangers H11-2 and H12-2 ? (port to stbd)

8. H6-2
   Ans.
   6'2" Above
   13'7"

9. H7-2
   Ans.
   33" Above

BEST COPY AVAILABLE

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number (Answer Sheet)

1. H1-2
   Ans. 18'7" Fwd. centerline 2nd reduction gear
   15'7" Stbd of centerline
   44" Above Main Axis

2. H4-2
   Ans. 10'7.8" Fwd. centerline 2nd reduction gear
   43.1" Above Main Axis
   13' Port of centerline

3. H11-2
   Ans. 12'4" Stbd of centerline
   72.1" Above Main Axis
   27'7.0" Fwd. centerline 2nd redudtion gear

4. H10-2 (no height dim)
   Ans. 23'0.2" Fwd. centerline 2nd reduction gear
   12'11.6" Port of centerline

5. H3-2
   Ans. 43.1" Above Main Axis
   10'7.8" Fwd 2nd reduction gear centerline
   13' Stbd of centerline

6. H2-2
   Ans. 18'7" Fwd 2nd reduction gear centerline
   15'7" Port of centerline
   44" Above Main Axis

7. H12-2
   Ans. 12'4" Port of centerline
   72.1" Above Main Axis
   24'7.0" Fwd 2nd reduction gear centerline

8. H6-2
   Ans. 12'4.5" Fwd 2nd reduction gear centerline
   6'2" Above Main Axis
   13'7" Port of centerline

9. H7-2
   Ans. 17'9.0" Fwd 2nd reduction gear centerline
   33" Above Main Axis
   12'11.6" Stbd of centerline

BEST COPY AVAILABLE

10. H9-2 (no height dim.)
Ans. 23'9.2" Fwd 2nd reduction gear centerline
12'11.6" Stbd of centerline

11. H5-2
Ans. 12'4.5" Fwd 2nd reduction gear centerline
13'7" Stbd of centerline
6'2" Above Main Axis

12. H8-2
Ans. 17'9.0" Fwd 2nd reduction gear centerline
33" Above Main Axis
12'11.6" Port of centerline

13. How far above the main axis is SSTG Set No.1 ?
Ans. 8'2.5" AMA

14. How far apart are hangers H4-2 and H10-2 ? (Fwd & Aft)
Ans. 12'4.4"

15. What is the distance between hangers H11-2 & H12-2 ? (Port & Stbd)
Ans. 24'8.0"

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

87742-3101 R/E

1. How far above the main axis would you locate hanger H-6?
   Ans.

2. What type of fitting is used to connect P8-3 to P8-2?
   Ans.

3. How far off the vertical is GS-15 rolled?
   Ans.

4. In what direction is the flow for P-32?
   Ans.

5. What type of fitting is F-16?
   Ans.

6. In which direction is the flow for GS-5?
   Ans.

7. How far port or stbd of $C_L$ is the F-22 that is attached to P8-1?
   Ans.

8. How far fwd or aft of the frame is GS-75-GA-03 located?
   Ans.

9. How far above main axis is hanger H15-1 located?
   Ans.

10. How far from the Ref to $C_L$ is hanger H2-1 located?
    Ans.

11. What Reference and Plan number would give the details of GS-75-GA-03?
    Ans.

12. When locating hanger H22-1 aboard ship what valve would you use for an approximate location?
    Ans.

13. What Reference and Plan number would give the hanger details?
    Ans.

14. In the general notes what must be considered before using the tolerance block for pipehanger locations?
    Ans.

15. When reading a blueprint and a discrepancy is found, who must be notified?
    Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

87742-3101 R/E

1. How far above the main axis would you locate hanger H-6?
   Ans. 27.5"

2. What type of fitting is used to connect P8-3 to P8-2?
   Ans. F-2 90 Degree Elbow

3. How far off the vertical is GS-15 rolled?
   Ans. 15 Degrees

4. In what direction is the flow for F-32?
   Ans. Fwd.

5. What type of fitting is F-16?
   Ans. Concentric Reducer 3.00 X 2.00 IPS

6. In which direction is the flow for GS-5?
   Ans. Fwd.

7. How far port or stbd of $C_L$ is the F-22 that is attached to P8-1?
   Ans. Right on the $C_L$

8. How far fwd or aft of the frame is GS-75-GA-03 located?
   Ans. 17' 3" Fwd of Ref to RFR

9. How far above main axis is hanger H15-1 located?
   Ans. 99.0" AMA

10. How far from the Ref to $C_L$ is hanger H2-1 located?
    Ans. 101.0" Stbd

11. What Reference and Plan number would give the details of GS-75-GA-03?
    Ans. Ref. 18 87728-1502

12. When locating hanger H22-1 aboard ship what valve would you use for an approximate location?
    Ans. GS-15

13. What Reference and Plan number would give the hanger details?
    Ans. Ref. 12 87524-4801

14. In the general notes what must be considered before using the tolerance block for pipehanger locations?
    Ans. G.N. 48 (Installation of surrounding Equipment)

15. When reading a blueprint and a discrepancy is found, who must be notified?
    Ans. Your Supervisior

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

87742-3103 R/P

1. How far off $C_L$ would you install GS-10?
   Ans.

2. How far above or below main axis would you install hanger H4-3?
   Ans.

3. How far off $C_L$ is MS-3 installed?
   Ans.

4. How far off the centerline would you install Ident hanger number 2?
   Ans.

5. How far off $C_L$ would you install Ident hanger number 3?
   Ans.

6. How far stbd. of $C_L$ would you install the F-28 that is attached to P79-3?
   Ans.

7. What size and type fitting is F-4?
   Ans.

8. Between what frames would the $C_L$ of the steam chest be located?
   Ans.

9. How far above main axis would FL-5 be located?
   Ans.

10. How far above the main axis and on what pipe would H12-3 be located?
    Ans.

11. To what pipe does F-9 attach?
    Ans.

12. Give the three point location for GS-75-DP-05.
    Ans.

13. Where would the information be found to fabricate F-26?
    Ans.

14. What is the total length required for P71?
    Ans.

15. Between Frs. 123 and 124 how many degrees would P41-1 be bent to attach to FL-2?
    Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

87742-3103 R/P

1. How far off $C_L$ would you install GS-10?
   Ans. 2" Stbd
2. How far above or below main axis would you install hanger H4-3?
   Ans. 19" AMA
3. How far off $C_L$ is MS-3 installed?
   Ans. 187" Stbd of Ref to $C_L$
4. How far off the centerline would you install Ident hanger number 2?
   Ans. 11' 4" Stbd
5. How far off $C_L$ would you install Ident hanger number 3?
   Ans. 160.5" Stbd of Ref to $C_L$
6. How far stbd. of $C_L$ would you install the F-28 that is attached to P79-3?
   Ans. 12' 9.5" Stbd of Ref to $C_L$
7. What size and type fitting is F-4?
   Ans. 1.500 Flex-Hose Assy
8. Between what frames would the $C_L$ of the steam chest be located?
   Ans. Fr. 123 & Fr. 124
9. How far above main axis would FL-5 be located?
   Ans. 9' 2.1"
10. How far above the main axis and on what pipe would H12-3 be located?
    Ans. 61.2" AMA on P75-2
11. To what pipe does F-9 attach?
    Ans. P-79
12. Give the three point location for GS-75-DP-05.
    Ans. 185.5" Stbd, 121" AMA, 13" Ref to $C_L$ 2nd Red Gear
13. Where would the information be found to fabricate F-26?
    Ans. 87201-0750 It. 3
14. What is the total length required for P71?
    Ans. 6 Feet
15. Between Frs. 123 and 124 how many degrees would P41-1 be bent to attach to FL-2?
    Ans. 30 Degrees

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:
87742-3104 R/F

1. How far fwd or aft of the frame and above or below the main axis is FL-6 located?
   Ans.

2. What is the material of the fasteners used for FL-3?
   Ans.

3. In which direction is the flow for GS-8, Port or Stbd?
   Ans.

4. How far off $C_L$ is the F-21 that is attached P72-4?
   Ans.

5. How far of $C_L$ and how far fwd or aft of the frame is H3-4 located?
   Ans.

6. Give all dimensions to locate GS-75-DP-06?
   Ans.

7. What is the distance between Ident Hgrs. 3 & 4?
   Ans.

8. What valve is used to feed GS-75-DP-06?
   Ans.

9. What type of Assy is F-22?
   Ans.

10. How far above the main axis would you install F-22?
    Ans.

11. How far above the main axis is hanger H-7?
    Ans.

12. What is the distance between Ident H2 from GS-75-DP-06?
    Ans.

13. What is the minimum bend radius for .250 OD tubing?
    Ans.

14. What will be the thickness of the insulation for P72?
    Ans.

15. How far from the $C_L$ turbine is SSTG set turbine #2?
    Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:
87742-3104 R/F

1. How far fwd or aft of the frame and above or below the main axis is FL-6 located?
   Ans. 2.2" Fwd RFR 124, 9'2.1" AMA

2. What is the material of the fasteners used for FL-3?
   Ans. Galvanized Steel

3. In which direction is the flow for GS-8, Port or Stbd?
   Ans. Port

4. How far off $C_L$ is the F-21 that is attached P72-4?
   Ans. 15' 10.8" Port of Ref to $C_L$

5. How far of $C_L$ and how far fwd or aft of the frame is H3-4 located?
   Ans. 8' 2.3" Port, 19.5" Aft RFR 124

6. Give all dimensions to locate GS-75-DP-06?
   Ans. 12'11.0" Port, 19.0" Aft 2nd Red Gear $C_L$, 92.0" AMA

7. What is the distance between Ident Hgrs. 3 & 4?
   Ans. 29.5"

8. What valve is used to feed GS-75-DP-06?
   Ans. GS-28

9. What type of Assy is F-22?
   Ans. Flex-Hose

10. How far above the main axis would you install F-22?
    Ans. 27.2" AMA

11. How far above the main axis is hanger H-7?
    Ans. 26" Abv Ref to MA

12. What is the distance between Ident H2 from GS-75-DP-06?
    Ans. 75"

13. What is the minimum bend radius for .250 OD tubing?
    Ans. G.N. 22 9/16" Radius

14. What will be the thickness of the insulation for F72?
    Ans. 1" G.N. 15

15. How far from the $C_L$ turbine is SSTG set turbine #2?
    Ans. On $C_L$ Turbine

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

87742-1302 R/E

1. In which direction is the flow on GS-6?
   Ans.

2. What type of valve is GS-24?
   Ans.

3. How far off the horizontal is GS-16 rolled?
   Ans.

4. In what direction is the flow for F-32?
   Ans.

5. How far AMA would you locate GS-9?
   Ans.

6. How far AMA and how far off $C_L$ would you locate GS-75-GA-04?
   Ans.

7. What two pipes service GS-12?
   Ans.

8. How far fwd or aft is FS-75-GA-04 located?
   Ans.

9. What turbine does P26-2 service?
   Ans.

10. How far Port or Stbd of $C_L$ is P70-2 located?
    Ans.

11. What does the FL-2 attached to P24-2 connect to?
    Ans.

12. What type and size fitting is F-17?
    Ans.

13. Give all locations to attach F-10 to P14-2 and P14-3.
    Ans.

14. What is the distance between F-11 and GS-24?
    Ans.

15. What items are required to attach P14-1 to P18-3?
    Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

87742-1302 R/E

1. In which direction is the flow on GS-6?
   Ans. Fwd.

2. What type of valve is GS-24?
   Ans. Valve Angle Relief

3. How far off the horizontal is GS-16 rolled?
   Ans. 45 Degrees

4. In what direction is the flow for F-32?
   Ans. Fwd.

5. How far AMA would you locate GS-9?
   Ans. 100.25 Abv. Ref to MA

6. How far AMA and how far off $C_L$ would you locate GS-75-GA-04?
   Ans. 93.5 Abv. Ref to MA- 114.9 Port of Ref to $C_L$

7. What two pipes service GS-12?
   Ans. P30-1 & P30-2

8. How far fwd or aft is FS-75-GA-04 located?
   Ans. 17' 3" Fwd of Ref toRFR

9. What turbine does P26-2 service?
   Ans. Propulsion Turbine No.2

10. How far Port or Stbd of $C_L$ is P70-2 located?
    Ans. 107.5"

11. What does the FL-2 attached to P24-2 connect to?
    Ans. Ref. Piping Steam Connection Ref 30

12. What type and size fitting is F-17?
    Ans. Reducer Concentric 4.00 X 3.00 IPS Sch 80

13. Give all locations to attach F-10 to P14-2 and P14-3.
    Ans. 24.3"AMA, 10'2"Port, 21'7.6"Fwd Ref to RFR

14. What is the distance between F-11 and GS-24?
    Ans. 6.25"

15. What items are required to attach P14-1 to P18-3?
    Ans. F-17 & F-15

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:
87744-3004 R/G

1. What type of valve is CF-135?
Ans.

2. What pump does P352-1 connect to?
Ans.

3. What size pipe is P128-3?
Ans.

4. What pipes does H48-4 support?
Ans.

5. What is the distance between H13-4 and H1-4?
Ans.

6. Could partial section 18-A be used to facilitate installation?
Ans.

7. What type of Assy. is F-18?
Ans.

8. What type and size end fittings are used for F-18?
Ans.

9. On CF-130 what type and size fitting is FL-2?
Ans.

10. What pipe does Ident hanger No.1 support?
Ans.

11. What is the Reference and Plan no. for hangers on this system?
Ans.

12. To what two fittings does P140-1 attach?
Ans.

13. What valve is used to feed CF-73-GA-58 gageboard?
Ans.

14. In which direction is the flow for CF-138? (Fwd or Aft)
Ans.

15. What is the Reference and Plan number for gageboards on this system?
Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:
87744-3004 R/G

1. What type of valve is CF-135?
   Ans. Gate Valve

2. What pump does P352-1 connect to?
   Ans. Main Feed Pump No. 2

3. What size pipe is P128-3?
   Ans. 1.900OD X 0.134 Min

4. What pipes does H48-4 support?
   Ans. P189-1, P135-1

5. What is the distance between H13-4 and H1-4?
   Ans. 118.5"

6. Could partial section 18-A be used to facilitate installation?
   Ans. No

7. What type of Assy. is F-18?
   Ans. 90 degree Flex-Hose Assy.

8. What type and size end fittings are used for F-18?
   Ans. F-12 Union Assy. - 2" IPS

9. On CF-130 what type and size fitting is FL-2?
   Ans. Flange - 1.500 IPS

10. What pipe does Ident hanger No.1 support?
    Ans. P307

11. What is the Reference and Plan no. for hangers on this system?
    Ans. Ref. 5 87524-7503

12. To what two fittings does P140-1 attach?
    Ans. F-8 & F-4

13. What valve is used to feed CF-73-GA-58 gageboard?
    Ans. CF-254

14. In which direction is the flow for CF-138? (Fwd or Aft)
    Ans. Aft

15. What is the Reference and Plan number for gageboards on this system?
    Ans. Ref. 13 Plan No. 87728-1502

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:
Drawing No. 87744-3002 R/G

1. How far BMA would you locate CF-153?
   Ans.

2. What type of valve is CF-152 used on the 729 Boat?
   Ans.

3. How far port or stbd of $C_L$ is F-14 located?
   Ans.

4. To what pipe does F-31 attach?
   Ans.

5. How far BMA would CF-331 be located?
   Ans.

6. In what direction is the flow for CF-203?
   Ans.

7. How far fwd of Fr. 113 would CF-331 be installed?
   Ans.

8. After installation will CF-154 be locked open or closed?
   Ans.

9. How far fwd of Fr. 113 is the F-2 on P172-1 located?
   Ans.

10. What is F-20 and how much is required?
    Ans.

11. What size clamp half would be used on P157-2?
    Ans.

12. Why is piping on this drawing insulated?
    Ans.

13. What Reference and Plan would be used for the pipe details on this system?
    Ans.

14. What does P168-2 and P162-6 connect into?
    Ans.

15. What Reference and Plan numbers are used for the hangers on this system?
    Ans.

B-28, PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:
Drawing No. 87744-3002 R/G

1. How far BMA would you locate CF-153?
   Ans. 16' 3" BMA
2. What type of valve is CF-152 used on the 729 Boat?
   Ans. Globe Stop Check
3. How far port or stbd of $C_L$ is F-14 located?
   Ans. 2' 6"
4. To what pipe does F-31 attach?
   Ans. P158
5. How far BMA would CF-331 be located?
   Ans. 7' 9.2"
6. In what direction is the flow for CF-203?
   Ans. Up
7. How far fwd of Fr. 113 would CF-331 be installed?
   Ans. 18' 4.5"
8. After installation will CF-154 be locked open or closed?
   Ans. Closed
9. How far fwd of Fr. 113 is the F-2 on P172-1 located?
   Ans. 19' 1.5"
10. What is F-20 and how much is required?
    Ans. Stave Damping - 22'
11. What size clamp half would be used on P157-2?
    Ans. 2" IPS
12. Why is piping on this drawing insulated?
    Ans. G.N. 37 Perssonnel Protection
13. What Reference and Plan would be used for the pipe details on this system?
    Ans. Ref. 2 87744-3032
14. What does P168-2 and P162-6 connect into?
    Ans. Feed Compound Tank
15. What Reference and Plan numbers are used for the hangers on this system?
    Ans. Ref 11 & 25 87524-7502 & 87524-7504